



United States  
Department of  
Agriculture



Natural  
Resources  
Conservation  
Service

In cooperation with  
Tennessee Agricultural  
Experiment Station,  
Tennessee Department of  
Agriculture, Morgan  
County, and Morgan  
County Soil Conservation  
District

# Soil Survey of Morgan County, Tennessee



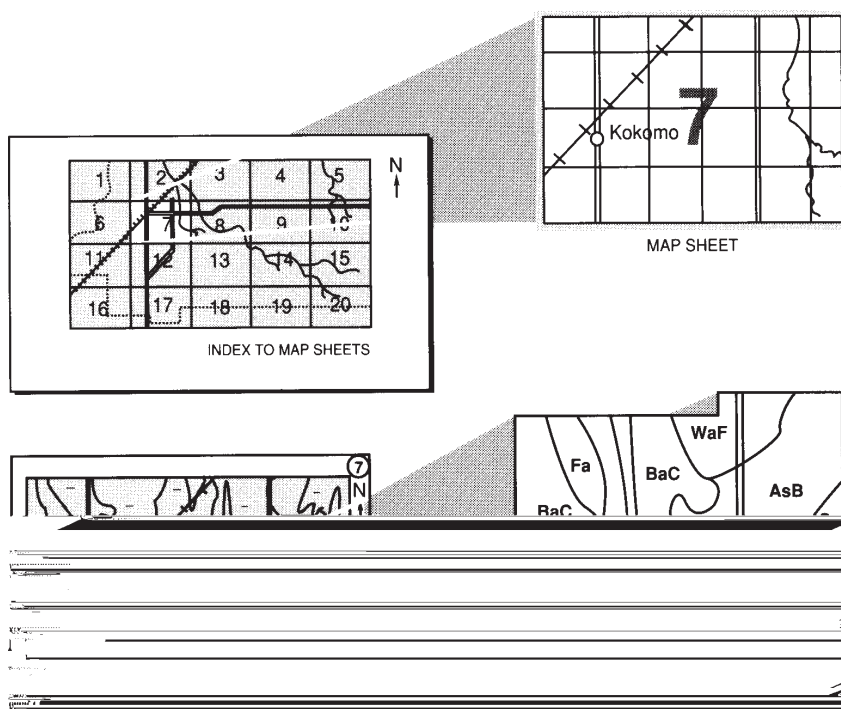
# How To Use This Soil Survey

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2002. Soil names and descriptions were approved in 2002. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2002. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Tennessee Department of Agriculture, Morgan County, and the Morgan County Soil Conservation District. The survey is part of the technical assistance furnished to the Morgan County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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**Cover:** An area of Lily loam, 5 to 12 percent slopes, is in the foreground. An area of Allegheny-Cotaco complex, occasionally flooded, is on the flood plain in the center. An area of Gilpin-Bouldin-Petros complex, 25 to 75 percent slopes, very stony, is on the mountainsides in the background.

*Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at <http://www.nrcs.usda.gov>.*

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# Foreword

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This soil survey contains information that affects land use planning in Morgan County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford  
State Conservationist  
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# Soil Survey of Morgan County, Tennessee

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By Harry C. Davis and Jennifer R. Yaeger, Natural Resources Conservation Service

Fieldwork by Harry C. Davis, Mark Dew, William Loftis, and Jennifer R. Yaeger,  
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United States Department of Agriculture, Natural Resources Conservation Service,  
in cooperation with  
Tennessee Agricultural Experiment Station, Tennessee Department of Agriculture,  
Morgan County, and Morgan County Soil Conservation District

MORGAN COUNTY has an area of approximately 334,500 acres, or 540 square miles. It is bordered by Fentress County to the west, Cumberland County to the southwest, Roane County to the southeast, Anderson County to the east, and Scott County to the north (fig. 1). Morgan County is located approximately 45 miles west of Knoxville and 160 miles northeast of Nashville. It lies entirely within the Cumberland Plateau and Mountains Major Land Resource Area (MLRA 125).

In 2003, according to the United States Census Bureau, Morgan County had a population of 20,080. Forest covers approximately 88 percent of the county. The majority of cleared land is used for pasture and hay, row crops, and urban or residential areas. Many of the soils formed in woodland and are typically light in color, strongly acid, and highly leached. They range in depth from shallow to very deep, have loamy subsoils, and have few to many rock fragments.

## General Nature of the Survey Area

This section gives general information about Morgan County. It discusses settlement and history; natural resources and industry; physiography, geology, relief, and drainage; transportation; and climate.

### Settlement and History

It is believed that the earliest inhabitants of the survey area were Woodland Indians, as evidenced by burial mounds along the Emory River. The Woodland Indians flourished in North America between 100 B.C. and 1000 A.D. During the 18th century, the Cherokee Tribe used the area as a hunting ground. In 1805, however, this situation changed because the Third Treaty of Tellico was signed between the Cherokees and the white negotiators J. Meigs and Daniel Smith. The treaty promised the Indians \$14,000 with a \$3,000 annuity in exchange for all lands north of the Duck River and east to the Tennessee River and for all the land of the Cumberland Plateau. Shortly

## Soil Survey of Morgan County, Tennessee



Figure 1.—Location of Morgan County in Tennessee.

after the signing and implementation of this treaty, the first white settlers arrived and claimed land in present-day Morgan County.

Many of the first settlers were Revolutionary War veterans who received land grants in payment for their service. Early residents of Morgan County mostly hunted and practiced subsistence farming, limited animal husbandry, and small-scale grain farming. Access to the area was very difficult due to the rugged terrain and the lack of navigable waterways. In 1817, Morgan County was formed from parts of Roane and Anderson Counties and became the 39th county. In 1823, Fentress County was formed from part of Morgan County; in 1849, Scott County was formed; and in 1855, Cumberland County was formed.

Morgan County was named for Brigadier General Daniel Morgan who was a Wagoner in Braddock's army during the French and Indian War. During the Revolutionary War he fought in the Battle of Saratoga and later led the continental army that defeated the British at the Battle of Cowpens in South Carolina (3).

In the mid and late 1800's, several attempts were made to establish colonies in Morgan County. In 1845, one such attempt by George F. Gerding, founder of the East Tennessee Colonization Company, led to the establishment of Wartburg. Gerding and his partners and colleagues from Europe and New York recruited not only American but also German and Swiss settlers to the area with the promise of beautiful scenery and fertile farmland. The colony and town were named for Wartburg Castle in Thuringia, Germany, where Martin Luther first translated the Bible into German. Many of the settlers were professionals, such as doctors, craftsmen, or tradesmen, and found the rugged and infertile soils difficult to farm. Eventually, bad weather, low crop production, and long distances to markets forced most of the original colonists to move elsewhere. Those that remained grew specialty crops, such as fruits and potatoes, or worked at trades in town. The colony of Wartburg eventually grew into a thriving town and became the second county seat of Morgan County.

In 1879, Thomas Hughes, author of "Tom Brown's School Days," created, along with several investors, the Board of Aid to Land Ownership Limited in England. Upon visiting America, Hughes became acquainted with Frank W. Smith, a Boston businessman. Smith informed the Board of Aid that land was available in Morgan, Scott, and Fentress Counties. In 1880, the Board of Aid purchased 75,000 acres in Morgan County in hopes of fulfilling Hughes dream of an English settlement. The colony began with 200 settlers, 80 of which were English and 40 of which were from Tennessee; the rest were from other States. The town they formed, known as Rugby, would grow and thrive for only a short time. The colony was unable to turn a profit and become self sufficient. Many of the former Englishmen were given the term "remittance men," because they received money from home and never became craftsmen, farmers, or laborers. Attempts were made to grow a few crops, and tourism provided some income for Rugby when the colony advertised itself as a health resort. Unfortunately, a typhoid epidemic in 1881 countered the colony's claim to a healing environment. These factors have been attributed to the demise of the colony and the agricultural utopia that Thomas Hughes had envisioned. Because Hughes in fact had rarely visited the colony and the Board was located in England, poor management

decisions were made that limited development and expansion. Even if the members had been successful in raising crops or livestock, they were too far from markets to sell their products. In 1899, the colony was sold to the Rugby Land Company and went into American hands. Many of the residents left to find a better living in larger towns. Rugby still exists today and has 20 of the original structures intact. It is now known as Historic Rugby and continues to attract tourists (6).

As a result of the dissolution of the convict lease system, the Tennessee General Assembly passed a bill in April of 1893 for the construction of a penitentiary and the purchase of property containing coal and farmland in Morgan County. Land in the area around Petros was determined by State Geologist, Dr. James M. Stafford, to contain large deposits of coal. The State of Tennessee purchased 9,000 acres from the East Tennessee Land Company with the provision that the company build 20 miles of railroad track from Harriman to the prison site in a 6-month period. In 1894, prisoners helped to construct the Harriman Coal and Iron Railroad. By 1896, they were mining 1,000 tons of coal per day. In 1900, the State purchased more land, bringing the total area encompassing the Brushy Mountain Penitentiary to 13,000 acres. At that time, Morgan County was expanded into Anderson County in order to keep the property exclusively within Morgan County. In 1933, about 9,000 acres of the prison property was turned over to the Tennessee Department of Agriculture and served as a residence and work camp for the Civilian Conservation Corps. As a result of a declining coal industry, the last coal mine operated by the prison was closed in 1966. The prison, however, is still in operation.

## **Natural Resources and Industry**

Lumber has been the most profitable natural resource in Morgan County. Lumber production has been the county's leading industry since the end of the Civil War. The county also has been a large producer of coal since the 1800's and still has many large reserves remaining despite the decreased production since the 1960's. In 1910, Morgan County ranked fourth in the State in coal production. Other natural resources include oil and natural gas.

## **Physiography, Geology, Relief, and Drainage**

Morgan County lies in the Cumberland Plateau and Mountains Major Land Resource Area (MLRA 125). The majority of the area is part of the Cumberland Plateau. The Cumberland Plateau consists of broad, rolling flats dissected by dendritic drainageways. The Cumberland Mountains are comprised of steep high mountains with narrow, uneven ridgelines and narrow intermountain valleys. The soils of the Cumberland Plateau and Mountains are underlain by level, interbedded shale, siltstone, and sandstone of Pennsylvanian age. Draining the Cumberland Mountain portion of the county are Clear Fork Creek and Bone Camp Fork Creek, which are two tributaries of the Big South Fork of the Cumberland River. Tributaries that drain the Cumberland Plateau portion to the Clinch River are the Obed River, Clear Creek, Daddys Creek, and the Emory River.

## **Transportation**

The primary highway intersecting Morgan County in a north-south direction is State Highway 27. The primary highway intersecting the county in an east-west direction is State Highway 62. The Norfolk Southern Railway intersects the county in a north-south direction. It was completed in 1880 and was formerly called the Cincinnati Southern Railroad. It extends from Chattanooga, Tennessee, to Cincinnati, Ohio.

## **Climate**

Table 1 gives data on temperature and precipitation for the survey area as recorded at Oneida, Tennessee, in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 34 degrees F and the average daily minimum temperature is 22 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -26 degrees. In summer, the average temperature is 71 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 17, 1980, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 55 inches. Of this, 27 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 2.6 inches. The heaviest 1-day rainfall during the period of record was 4.8 inches, recorded on September 3, 1982. Thunderstorms occur on about 47 days each year, and most occur between May and August.

The average seasonal snowfall is about 11 inches. The greatest snow depth at any one time during the period of record was 9 inches. On the average, 3 days of the year have at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 59 percent. Humidity is higher at night, and the average at dawn is about 86 percent. The sun shines 64 percent of the time possible in summer and 42 percent in winter. The prevailing wind is from the northeast. Average windspeed is highest, between 8 and 9 miles per hour, from January to April.

## **How This Survey Was Made**

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil

scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.





# Detailed Soil Map Units

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The map units delineated on the detailed soil maps represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called non-contrasting, or similar, components. They may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans and agronomic interpretations. If intensive use of a small area is planned, an onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, degree of erosion, and other characteristics that affect their use. On the basis of such

differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Atkins silt loam, frequently flooded, is a phase of the Atkins series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Allegheny-Cotaco complex, occasionally flooded, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Water is an example of a miscellaneous area.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

## **Ac—Allegheny-Cotaco complex, occasionally flooded**

### ***Composition***

Allegheny soil and similar inclusions: 50 to 70 percent

Cotaco soil and similar inclusions: 30 to 50 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau and mountain valleys

*Landform position:* Low terraces

*Shape of areas:* Long and narrow

*Size of areas:* 10 to 50 acres

*Slope range:* 0 to 3 percent

*Parent material:* Alluvium

### ***Soil Properties and Qualities***

*Drainage class:* Allegheny—well drained; Cotaco—moderately well drained

*Permeability:* Moderate

*Flood hazard:* Occasional

*Available water capacity:* High

*Depth to seasonal high water table:* Allegheny—more than 6 feet; Cotaco—2.0 to 2.5 feet from November through May

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

#### **Allegheny**

*Surface layer:*

0 to 6 inches—brown friable loam

*Subsurface layer:*

6 to 10 inches—dark yellowish brown friable loam

*Subsoil:*

10 to 24 inches—dark yellowish brown friable loam

24 to 39 inches—dark yellowish brown friable clay loam

39 to 45 inches—yellowish brown friable gravelly clay loam

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### *Substratum:*

45 to 60 inches—yellowish brown very friable gravelly fine sandy loam

### **Cotaco**

#### *Surface layer:*

0 to 6 inches—brown loam

#### *Subsurface layer:*

6 to 10 inches—dark yellowish brown friable loam

#### *Subsoil:*

10 to 24 inches—dark yellowish brown friable loam

24 to 36 inches—yellowish brown friable clay loam that has grayish and brownish mottles

36 to 45 inches—yellowish brown friable gravelly clay loam that has grayish and reddish mottles

### *Substratum:*

45 to 60 inches—mottled light brownish gray, strong brown, and yellowish brown very friable very gravelly fine sandy loam

### ***Contrasting Inclusions***

- Small areas of Pope and Philo soils
- Small areas of Atkins soils
- Small areas of a somewhat poorly drained soil in positions similar to those of the Allegheny and Cotaco soils

### ***Use and Management***

**Major uses:** Hay and pasture

**Common woodland vegetation:** Bottomland hardwoods

### **Cropland**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This map unit has good tilth and can be worked throughout a wide range of moisture content.
- The root zone is very deep but is limited in areas of the Cotaco soil by a seasonal high water table during winter and early spring.
- This map unit is moderately suited to winter wheat because of the flooding in winter and early spring.

### **Pasture and hayland**

*Suitability:* Well suited

#### *Management measures and considerations:*

- Only hay and pasture plants that can tolerate periodic inundation and seasonal wetness should be seeded.
- This map unit is poorly suited to alfalfa because of seasonal wetness and flooding.

### **Woodland**

*Suitability:* Well suited

#### *Management measures and considerations:*

- The seedling mortality rate caused by the flooding and plant competition are the only significant management concerns.

- To compensate for the higher mortality rate, larger trees can be planted or more trees than normal can be planted.

#### **Building site development**

*Suitability:* Unsited; limitations may be overcome by careful site selection

*Management measures and considerations:*

- These soils are not suited to dwellings because of the flooding.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- These soils are unsited to septic tanks absorption fields because of the flooding.

#### ***Interpretive Group***

*Land capability classification:* 2w

### **At—Atkins silt loam, frequently flooded**

#### ***Composition***

Atkins soil and similar inclusions: 85 to 95 percent

#### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau and mountains

*Landform position:* Flood plains

*Shape of areas:* Long and linear

*Size of areas:* 5 to 25 acres

*Slope range:* 0 to 2 percent

*Parent material:* Alluvium

#### ***Soil Properties and Qualities***

*Drainage class:* Poorly drained

*Permeability:* Moderate

*Flood hazard:* Frequent

*Available water capacity:* High (more than 6 inches)

*Seasonal high water table:* At or near the surface in late winter and early spring

*Soil reaction:* Strongly acid or very strongly acid, except the surface layer is less acid in limed areas

*Depth to bedrock:* More than 60 inches

#### ***Typical Profile***

*Surface layer:*

0 to 6 inches—grayish brown silt loam

*Subsoil:*

6 to 36 inches—light brownish gray and gray silt loam

36 to 46 inches—light gray silty clay loam

*Substratum:*

46 to 62 inches—light gray fine sandy loam

#### ***Contrasting Inclusions***

- Small areas of Philo soils
- Soils that are somewhat poorly drained in the slightly higher positions

### ***Use and Management***

**Major uses:** Pasture

**Common woodland vegetation:** Bottomland hardwoods

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Seasonal flooding limits the production and harvesting of crops.

#### **Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Only hay and pasture plants that can tolerate periodic inundation and seasonal wetness should be seeded.
- Grazing when the soil is wet results in compaction and destruction of the sod.

#### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Because of the seasonal high water table, the use of equipment is restricted to dry periods, midsummer through early fall, when the water table is lowest.
- The seedling mortality rate may be high in areas that are subject to flooding.
- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

#### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- This soil is not suited to dwellings because of the wetness and flooding.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- This soil is unsited to septic tank absorption fields because of the flooding and internal wetness.

### ***Interpretive Group***

*Land capability classification:* 3w

## **Bm—Bethesda-Mines pit complex, 10 to 80 percent slopes**

### ***Composition***

Bethesda soil and similar inclusions: 50 to 90 percent

Mines pit: 10 to 40 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Hilly plateau and mountains

*Landform position:* Surface-mined areas

*Shape of areas:* Typically long and linear

*Size of areas:* 5 to 200 acres

*Slope range:* 10 to 80 percent

*Parent material:* Acid regolith from surface-mining operations

### ***Properties and Qualities of the Bethesda Soil***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Flood hazard:* None

*Available water capacity:* Moderate (4 to 6 inches)

*Seasonal high water table:* None

*Soil reaction:* Strongly acid to extremely acid, except for the surface layer in reclaimed areas that have been limed

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

#### **Bethesda**

*Surface layer:*

0 to 2 inches—dark grayish brown friable channery loam

*Substratum:*

2 to 45 inches—brown, dark yellowish brown, and yellowish brown friable very channery loam and very channery clay loam

45 to 60 inches—yellowish brown friable channery loam

#### **Mines pit**

This part of the map unit consists of deep holes dug to remove coal seams from rock strata. One side is typically a high vertical rock wall adjacent to the pit.

### ***Contrasting Inclusions***

- Small areas of Lily, Ramsey, and Gilpin soils that have not been disturbed

### ***Use and Management***

**Major uses:** Areas are abandoned

**Common woodland vegetation:** None; some older areas have a few Virginia pine

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- This map unit is unsited to cropland because the slopes are too steep and soil properties are not favorable.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- This map unit is unsited to pasture and hay because the slopes are too steep and soil properties are not favorable.
- Some areas that have been reclaimed have a limited use for pasture.

#### **Woodland**

*Suitability:* Unsited

*Management measures and considerations:*

- Growth rate is slow, seedling mortality is high, and equipment use is limited on steep and very steep slopes.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope and unfavorable soil properties are severe limitations; a site should be selected in another map unit.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope and unfavorable soil properties are severe limitations; a site should be selected in another map unit.

***Interpretive Group***

*Land capability classification:* 7e

**GnC—Gilpin silt loam, 5 to 12 percent slopes**

***Composition***

Gilpin soil and similar inclusions: 85 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Ridgetops

*Shape of areas:* Irregular

*Size of areas:* 5 to 40 acres

*Slope range:* 5 to 12 percent

*Parent material:* Shale and siltstone residuum

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Low

*Seasonal high water table:* None

*Soil reaction:* Strongly acid or very strongly acid throughout, except the surface layer is less acid in limed areas

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow channery very friable silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 to 35 inches—rippable shale

### ***Contrasting Inclusions***

- Sequoia soils that have clayey textures throughout the subsoil
- Lily soils that are underlain by hard sandstone bedrock

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The risk of erosion can be reduced by using practices that include minimum tillage, planting legumes and grasses in the rotation, maintaining crop residue on the surface, and using other erosion-control practices. Site-specific recommendations are needed.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by rotating grazing, using proper stocking rates, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Structures should be designed to conform to the natural slope.

#### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 3e

## **GnD—Gilpin silt loam, 12 to 20 percent slopes**

### ***Composition***

Gilpin soil and similar inclusions: 85 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 40 acres



*Slope range:* 12 to 20 percent

*Parent material:* Shale and siltstone residuum

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Low

*Seasonal high water table:* None

*Soil reaction:* Strongly acid or very strongly acid throughout, except the surface layer is less acid in limed areas

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow channery very friable silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 to 35 inches—rippable shale

### ***Contrasting Inclusions***

- Sequoia soils that have clayey textures throughout the subsoil
- Lily soils that are underlain by hard sandstone bedrock

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The risk of erosion can be reduced by using practices that include minimum tillage, planting legumes and grasses in the rotation, maintaining crop residue on the surface, and using other erosion-control practices. Site-specific recommendations are needed.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by rotating grazing, using proper stocking rates, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Structures should be designed to conform to the natural slope.

**Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification:* 4e

**GpE—Gilpin-Petros complex, 20 to 35 percent slopes**

***Composition***

Gilpin soil and similar inclusions: 40 to 60 percent

Petros soil and similar inclusions: 30 to 50 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 40 acres

*Slope range:* 20 to 35 percent

*Parent material:* Shale and siltstone residuum

***Soil Properties and Qualities***

*Drainage class:* Gilpin—well drained; Petros—excessively drained

*Permeability:* Gilpin—moderate; Petros—rapid

*Flood hazard:* None

*Available water capacity:* Gilpin—low; Petros—very low

*Seasonal high water table:* None

*Soil reaction:* Strongly acid or very strongly acid throughout the profile

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

**Gilpin**

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow very friable channery silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 to 35 inches—rippable shale

## **Petros**

### *Surface layer:*

0 to 2 inches—dark grayish brown very friable channery silt loam

### *Subsoil:*

2 to 8 inches—yellowish brown friable very channery silt loam

8 to 16 inches—yellowish brown friable extremely channery silt loam

### *Bedrock:*

16 to 26 inches—rippable shale

## ***Contrasting Inclusions***

- Sequoia soils that have clayey textures throughout the subsoil
- Lily soils that are underlain by hard sandstone bedrock
- Shelocta soils in concave areas on the lower side slopes

## ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

## **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, the use of equipment is limited and the erosion hazard is very severe unless a good plant cover is maintained.

## **Pasture and hayland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Because of the slope, most management practices are limited and the erosion hazard is very severe unless a good plant cover is maintained.

## **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.
- The slope limits the use of equipment.

## **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope greatly inhibits building structures; a site should be selected on a better suited soil.

## **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Septic tank absorption lines should be installed on the less sloping included soils or a site should be selected on a better suited soil.

***Interpretive Group***

*Land capability classification: 7s*

**GpF—Gilpin-Petros complex, 35 to 80 percent slopes**

***Composition***

Gilpin soil and similar inclusions: 50 to 70 percent

Petros soil and similar inclusions: 20 to 40 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Side slopes

*Shape of areas:* Irregular

*Size of areas:* 100 to 500 acres

*Slope range:* 35 to 70 percent

*Parent material:* Shale and siltstone residuum

***Soil Properties and Qualities***

*Drainage class:* Gilpin—well drained; Petros—excessively drained

*Permeability:* Gilpin—moderate; Petros—rapid

*Flood hazard:* None

*Available water capacity:* Gilpin—low; Petros—very low

*Seasonal high water table:* None

*Soil reaction:* Strongly acid or very strongly acid throughout the profile

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

**Gilpin**

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow very friable channery silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 to 35 inches—rippable shale

**Petros**

*Surface layer:*

0 to 2 inches—dark grayish brown very friable channery silt loam

*Subsoil:*

2 to 8 inches—yellowish brown friable very channery silt loam

8 to 16 inches—yellowish brown friable extremely channery silt loam

*Bedrock:*

16 to 26 inches—rippable shale

***Contrasting Inclusions***

- Bouldin soils in concave positions below bluffs

- Shelocta soils in concave areas and on the lower side slopes
- Rock outcrops of sandstone along shoulder slopes or on nose slopes

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, the use of equipment is limited and the erosion hazard is very severe unless a good plant cover is maintained.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, most management practices are limited and the erosion hazard is very severe unless a good plant cover is maintained.

#### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and seeding cuts and fills.
- The slope limits the use of equipment.

#### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope greatly inhibits building structures; a site on a better suited soil should be selected.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Absorption lines should be installed on an included soil that has a lesser slope, or a site on a better suited soil should be selected.

### ***Interpretive Group***

*Land capability classification:* 7s

## **GsF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony**

### ***Composition***

Gilpin soil and similar inclusions: 30 to 40 percent

Bouldin soil and similar inclusions: 25 to 35 percent

Petros soil and similar inclusions: 20 to 30 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Mountains and hilly plateau

*Landform position:* Deep gorges and side slopes

*Shape of areas:* Irregular

*Size of areas:* 50 to 1,000 acres

*Slope range:* 25 to 75 percent

*Parent material:* Colluvium from sandstone and shale and residuum from shale and siltstone

### ***Soil Properties and Qualities***

*Drainage class:* Gilpin and Bouldin—well drained; Petros—excessively drained

*Permeability:* Gilpin—moderate; Bouldin—moderately rapid; Petros—rapid

*Flood hazard:* None

*Available water capacity:* Gilpin and Bouldin—low; Petros—very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Gilpin—20 to 40 inches; Bouldin—more than 60 inches; Petros—10 to 20 inches

*Surface stoniness:* Gilpin—0.5 to 1 percent; Bouldin—1 to 3 percent; Petros—less than 0.1 percent

### ***Typical Profile***

#### **Gilpin**

*Surface layer:*

0 to 3 inches—very dark grayish brown very friable silt loam

*Subsurface layer:*

3 to 6 inches—yellowish brown very friable silt loam

*Subsoil:*

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow friable channery silty clay loam that has brownish and reddish mottles

*Bedrock:*

25 to 35 inches—rippable shale

#### **Bouldin**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable flaggy loam

*Subsurface layer:*

2 to 17 inches—yellowish brown very friable channery loam

*Subsoil:*

17 to 30 inches—yellowish brown friable very channery loam

30 to 80 inches—strong brown friable extremely flaggy clay loam

#### **Petros**

*Surface layer:*

0 to 2 inch—dark grayish brown very friable channery silt loam

*Subsoil:*

2 to 8 inches—yellowish brown friable very channery silt loam

8 to 16 inches—yellowish brown friable extremely channery silt loam

*Bedrock:*

16 to 26 inches—rippable shale bedrock

***Contrasting Inclusions***

- Rock outcrops on upper side slopes
- Shelocta soils in positions similar to those of the Bouldin soil
- Lily soils on narrow benches

***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Cove hardwoods

**Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Tillage is impractical because of the slope and stones and cobbles on the surface.

**Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- Many management practices are limited because of the slope and stones and cobbles on the surface.

**Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.
- The use of equipment use is limited because of the slope.
- Stones on the surface can interfere with felling, yarding, and other logging operations that involve the use of equipment.
- Reforestation after harvest must be carefully managed to reduce plant competition.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope and the large number of stones on the surface severely limit most uses.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- The contamination of ground water is possible because of the high content of sand and coarse fragments, which do not sufficiently filter effluent.
- Septic tank absorption lines should be installed on an included soil that has a lesser slope, or a site should be selected on a better suited soil.

***Interpretive Group***

*Land capability classification:* 7s

**HeB—Hendon silt loam, 2 to 5 percent slopes**

***Composition***

Hendon soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau

*Landform position:* Broad ridgetops and upland interfluves

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 2 to 5 percent

*Parent material:* Loamy mantle over residuum from shale and sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Flood hazard:* None

*Available water capacity:* High

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—brown very friable silt loam

*Subsurface layer:*

3 to 12 inches—yellowish brown very friable silt loam

*Subsoil:*

12 to 24 inches—yellowish brown friable silty clay loam

24 to 36 inches—strong brown firm and brittle clay loam that has brownish and reddish mottles

36 to 60 inches—yellowish red friable clay loam that has reddish mottles

### ***Contrasting Inclusions***

- Small areas of Lily soils; over hard sandstone bedrock
- Small areas of Lonewood soils that do not have a compact and brittle layer in the subsoil
- Small areas of Gilpin soils; over rippable shale

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- This soil is moderately suited to alfalfa because of the restrictive layer in the subsoil.

#### **Pasture and hayland**

*Suitability:* Well suited



*Management measures and considerations:*

- Overgrazing reduces plant cover, causes compaction and erosion, and encourages weed growth.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

**Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The low soil strength is a severe limitation affecting local roads and streets. This limitation may be overcome by providing suitable subgrade or base material.

**Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The moderately slow permeability in the lower part of the subsoil is a severe limitation affecting septic tank absorption fields. Onsite investigation is needed to determine if a septic tank system can be designed for a specific area.

***Interpretive Group***

*Land capability classification:* 2e

**HeC—Hendon silt loam, 5 to 12 percent slopes**

***Composition***

Hendon soil and similar inclusions: 70 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau

*Landform position:* Broad ridgetops and upland interfluvies

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 5 to 12 percent

*Parent material:* Loamy mantle over residuum from shale and sandstone

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Flood hazard:* None

*Available water capacity:* High

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—brown very friable silt loam

*Subsurface layer:*

3 to 12 inches—yellowish brown very friable silt loam

*Subsoil:*

12 to 24 inches—yellowish brown friable silty clay loam

24 to 36 inches—strong brown firm and brittle clay loam that has brownish and reddish mottles

36 to 60 inches—yellowish red friable clay loam that has reddish mottles

### ***Contrasting Inclusions***

- Small areas of Lily soils; over hard sandstone bedrock
- Small areas of Lonewood soils that do not have a compact and brittle layer in the subsoil
- Small areas of Gilpin soils; over rippable shale

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- This soil is moderately suited to alfalfa because of the restrictive layer in the subsoil.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- Overgrazing reduces plant cover, causes compaction in the soil, causes erosion, and encourages weed growth.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The low soil strength is a severe limitation affecting local roads and streets. This limitation may be overcome by providing suitable subgrade or base material.
- Buildings should be designed to conform to the natural slope of the land.

### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The moderately slow permeability in the lower part of the subsoil is a severe limitation affecting septic tank absorption fields. Onsite investigation is needed determine if a septic tank system can be designed in a specific area.

### ***Interpretive Group***

*Land capability classification:* 3e

## **JnF—Jefferson cobbly loam, 20 to 50 percent slopes, stony**

### ***Composition***

Jefferson soil and similar inclusions: 90 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Plateaus and mountains

*Landform position:* Hillsides and footslopes

*Shape of areas:* Irregular

*Size of areas:* 10 to 80 acres

*Slope range:* 0 to 3 percent

*Parent material:* Alluvium

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Flooding:* None

*Available water capacity:* Low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam

40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 65 inches—yellowish brown friable very gravelly sandy loam

### ***Contrasting Inclusions***

- Gilpin soils on nose slopes
- Rock outcrops of sandstone on upper side slopes

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- This soil is unsited to row crops because of the slope, the stones and cobbles on the surface and in the subsoil, and the low available water capacity.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- The stones and cobbles on the surface and the slope are limitations affecting most management practices.

#### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Constructing water bars or broad-based dips, which direct water and sediment away from roads and streams and into duff layers or filter strips, helps to prevent damage to roads and skid trails and the sedimentation of streams.
- Seeding cut and filled areas helps to establish a permanent cover of vegetation.
- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.
- The slope limits the use of equipment.

#### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope is a limitation affecting building site development. It prevents the construction of streets and roads.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

### ***Interpretive Group***

*Land capability classification:* 7e

## **LbB—Lily loam, 2 to 5 percent slopes**

### ***Composition***

Lily soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumb 2497.odla Plquaauil anMoumene ied

*Size of areas:* 5 to 25 acres

*Slope range:* 2 to 5 percent

*Parent material:* Residuum from sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

### ***Contrasting Inclusions***

- Lonewood soils that are more than 40 inches deep to hard bedrock
- Gilpin and Wernock soils that are underlain by soft bedrock
- Ramsey soils that are less than 20 inches deep to hard bedrock

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

**Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification:* 2e

**LbC—Lily loam, 5 to 12 percent slopes**

***Composition***

Lily soil and similar inclusions: 70 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountains

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 5 to 12 percent

*Parent material:* Residuum from sandstone

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

***Contrasting Inclusions***

- Gilpin soils that are underlain by soft bedrock
- Very deep Shelocta soils; in concave areas

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

#### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 3e

## **LbD—Lily loam, 12 to 20 percent slopes**

### ***Composition***

Lily soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau

*Landform position:* Side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 200 acres

*Slope range:* 12 to 20 percent

*Parent material:* Residuum from sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Well drained  
*Permeability:* Moderately rapid  
*Flood hazard:* None  
*Available water capacity:* Moderate  
*Seasonal high water table:* None  
*Soil reaction:* Very strongly acid or strongly acid  
*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*  
0 to 3 inches—brown friable loam  
  
*Subsoil:*  
3 to 9 inches—yellowish brown friable loam  
9 to 30 inches—yellowish brown friable clay loam  
  
*Bedrock:*  
30 inches—hard sandstone

### ***Contrasting Inclusions***

- Ramsey soils that have bedrock at a depth of less than 20 inches
- Gilpin soils that are underlain by soft bedrock
- Rock outcrops of sandstone in a few areas

### ***Use and Management***

**Major uses:** Woodland  
**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Poorly suited  
*Management measures and considerations:*

- The risk of erosion can be reduced by using practices that include minimum tillage, long rotation of grasses and legumes, and other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

#### **Pasture and hayland**

*Suitability:* Moderately suited  
*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Moderately suited  
*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.

#### **Building site development**

*Suitability:* Poorly suited



*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.
- The slope greatly inhibits building structures; a site should be selected on a better suited soil.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.
- Septic tank absorption lines should be installed on a less sloping included soil, or a site should be selected on a better suited soil.

***Interpretive Group***

*Land capability classification:* 4e

**LgC—Lily-Gilpin complex, 5 to 12 percent slopes**

***Composition***

Lily soil and similar inclusions: 60 to 70 percent

Gilpin soil and similar inclusions: 25 to 35 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau and mountains

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 5 to 12 percent

*Parent material:* Residuum from sandstone

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Lily—moderately rapid; Gilpin—moderate

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Gilpin—low

*Seasonal high water table:* None

*Soil reaction:* Lily—very strongly acid or strongly acid; Gilpin—strongly acid or very strongly acid throughout, except the surface layer is less acid in limed areas

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

**Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

## **Gilpin**

### *Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

### *Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow very friable channery silty clay loam that has reddish and brownish mottles

### *Bedrock:*

25 to 35 inches—rippable shale

## ***Contrasting Inclusions***

- Soils that have clayey subsoils
- Small areas of Ramsey soils

## ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

## **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

## **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

## **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

## **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

## **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification: 3e*

**LgD—Lily-Gilpin complex, 12 to 20 percent slopes**

***Composition***

Lily soil and similar inclusions: 50 to 65 percent

Gilpin soil and similar inclusions: 30 to 40 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountains

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 12 to 20 percent

*Parent material:* Residuum from sandstone and shale

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Lily—moderately rapid; Gilpin—moderate

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Gilpin—low

*Seasonal high water table:* None

*Soil reaction:* Lily—very strongly acid or strongly acid; Gilpin—strongly acid or very strongly acid throughout, except the surface layer is less acid in limed areas

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

**Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

**Gilpin**

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow very friable channery silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 to 35 inches—rippable shale

### ***Contrasting Inclusions***

- Small areas of Sequoia soils
- Small areas of Ramsey soils
- Small areas of Petros soils

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

#### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 4e

## **LgE—Lily-Gilpin complex, 20 to 35 percent slopes**

### ***Composition***

Lily soil and similar inclusions: 50 to 60 percent

Gilpin soil and similar inclusions: 30 to 40 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 40 acres

*Slope range:* 20 to 35 percent

*Parent material:* Shale and sandstone residuum

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Lily—moderately rapid; Gilpin—moderate

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Gilpin—low

*Seasonal high water table:* None

*Soil reaction:* Lily—very strongly acid or strongly acid; Gilpin—strongly acid or very strongly acid throughout, except the surface layer is less acid in limed areas

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

#### **Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

#### **Gilpin**

*Surface layer:*

0 to 3 inches—dark grayish brown very friable silt loam

*Subsoil:*

3 to 6 inches—yellowish brown very friable silt loam

6 to 21 inches—yellowish brown friable silty clay loam

21 to 25 inches—brownish yellow very friable channery silty clay loam that has reddish and brownish mottles

*Bedrock:*

25 inches—rippable shale

### ***Contrasting Inclusions***

- Small areas of Sequoia soils
- Small areas of Ramsey soils
- Small areas of Petros soils

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, the use of equipment is limited and the erosion hazard is very severe unless a good plant cover is maintained.

### **Pasture and hayland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Because of the slope, most management practices are limited and the erosion hazard is very severe unless a good plant cover is maintained.

### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.
- The slope limits the use of equipment.

### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope greatly hinders building structures.
- A site should be selected on a better suited soil.

### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Septic tank absorption lines should be installed on a less sloping included soil, or a site should be selected on a better suited soil.

### ***Interpretive Group***

*Land capability classification:* 6e

## **LmC—Lily-Ramsey complex, 5 to 12 percent slopes**

### ***Composition***

Lily soil and similar inclusions: 55 to 65 percent

Ramsey soil and similar inclusions: 25 to 35 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau and mountains

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 5 to 12 percent

*Parent material:* Residuum from sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Lily—well drained; Ramsey—somewhat excessively drained

*Permeability:* Lily—moderately rapid; Ramsey—rapid

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Ramsey—very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Lily—20 to 40 inches; Ramsey—10 to 20 inches

### ***Typical Profile***

#### **Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

#### **Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown very friable gravelly sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

### ***Contrasting Inclusions***

- Soils that have bedrock at a depth of more than 40 inches
- Soils that have soft bedrock at a depth of 20 to 40 inches

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The very low available water and the shallow root zone in areas of the Ramsey soil are the main limitations.
- The Lily soil is moderately suited to crops.
- Erosion is a severe limitation affecting both of the major soils.

#### **Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The very low available water and the shallow root zone are the main limitations in areas of the Ramsey soil. These areas are poorly suited to pasture and hayland.
- The Lily soil is well suited to pasture and hay; it is best suited to tall fescue for pasture.

#### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility, the low available water capacity, and the moderately deep to shallow rooting zone.
- Windthrow is a hazard because of the shallow rooting zone.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

**Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification:* 6e

**LmD—Lily-Ramsey complex, 12 to 20 percent slopes**

***Composition***

Lily soil and similar inclusions: 50 to 60 percent

Ramsey soil and similar inclusions: 35 to 45 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountains

*Landform position:* Ridgetops and side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 12 to 20 percent

*Parent material:* Residuum from sandstone and shale

***Soil Properties and Qualities***

*Drainage class:* Lily—well drained; Ramsey—somewhat excessively drained

*Permeability:* Lily—moderately rapid; Ramsey—rapid

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Ramsey—very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Lily—20 to 40 inches; Ramsey—10 to 20 inches

***Typical Profile***

**Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam



*Bedrock:*

30 inches—hard sandstone

**Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown very friable gravelly sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

***Contrasting Inclusions***

- Soils that have bedrock at a depth of more than 40 inches
- Soils that have soft bedrock at a depth of 20 to 40 inches

***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

**Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The very low available water and the shallow root zone in areas of the Ramsey soil are the main limitations.
- The Lily soil is moderately suited to crops.
- Erosion is a severe limitation affecting both soils.

**Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The very low available water and shallow root zone are the main limitations in areas of the Ramsey soil. These areas are poorly suited to pasture and hayland.
- The Lily soil is well suited to pasture and hay; it is best suited to tall fescue for pasture.

**Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low fertility, the low available water capacity, and the moderately deep to shallow rooting zone.
- Windthrow is a hazard because of the shallow rooting zone.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

**Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification:* 6e

**LmE—Lily-Ramsey complex, 20 to 35 percent slopes**

***Composition***

Lily soil and similar inclusions: 45 to 55 percent

Ramsey soil and similar inclusions: 35 to 45 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Highly dissected uplands

*Landform position:* Side slopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 40 acres

*Slope range:* 20 to 35 percent

*Parent material:* Sandstone residuum

***Soil Properties and Qualities***

*Drainage class:* Lily—well drained; Ramsey—somewhat excessively drained

*Permeability:* Lily—moderately rapid; Ramsey—rapid

*Flood hazard:* None

*Available water capacity:* Lily—moderate; Ramsey—very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Lily—20 to 40 inches; Ramsey—10 to 20 inches

***Typical Profile***

**Lily**

*Surface layer:*

0 to 3 inches—brown friable loam

*Subsoil:*

3 to 9 inches—yellowish brown friable loam

9 to 30 inches—yellowish brown friable clay loam

*Bedrock:*

30 inches—hard sandstone

**Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown very friable gravelly sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

***Contrasting Inclusions***

- Soils that have bedrock at a depth of more than 40 inches
- Soils that have soft bedrock at a depth of 20 to 40 inches

***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

**Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, use of equipment is limited and the erosion hazard is very severe unless a good plant cover is maintained.

**Pasture and hayland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Because of the slope, most management practices are limited and the erosion hazard is very severe unless a good plant cover is maintained.

**Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.
- The slope limits the use of equipment.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope greatly hinders building structures.
- A site should be selected on a better suited soil.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Septic tank absorption lines should be installed on a less sloping included soil, or a site should be selected on a better suited soil.

***Interpretive Group***

*Land capability classification:* 6e

**LoB—Lonewood silt loam, 2 to 5 percent slopes**

***Composition***

Lonewood soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau

*Landform position:* Ridgetops and broad upland interfluves

*Shape of areas:* Irregular

*Size of areas:* 5 to 100 acres

*Slope range:* 2 to 5 percent

*Parent material:* Silty mantle over residuum from interbedded shale and sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* High

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* 40 to 60 inches or more

### ***Typical Profile***

*Surface layer:*

0 to 2 inches—brown silt loam

*Subsoil:*

2 to 8 inches—yellowish brown very friable silt loam

8 to 28 inches—yellowish brown friable silty clay loam

28 to 55 inches—strong brown and yellowish red friable clay loam

*Bedrock:*

55 to 60 inches—soft sandstone bedrock

### ***Contrasting Inclusions***

- Lily soils that are less than 40 inches deep to hard sandstone bedrock
- Gilpin soils that are less than 40 inches deep to soft shale
- Soils that are less than 40 inches deep to soft sandstone bedrock

### ***Use and Management***

**Major uses:** Pasture and woodland

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- Most climatically adapted crops can be grown.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- Overgrazing reduces plant cover, adds to compaction, causes erosion, and encourages weed growth.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The low soil strength is a severe limitation affecting local roads and streets. This limitation may be overcome by providing suitable subgrade or base material.

### **Septic tank absorption fields**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Increasing the size of the septic tank absorption area helps to compensate for the slower percolation rate.

### ***Interpretive Group***

*Land capability classification:* 2e

## **LoC—Lonewood silt loam, 5 to 12 percent slopes**

### ***Composition***

Lonewood soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus

*Landform position:* Ridgetops and broad upland interfluves

*Shape of areas:* Irregular

*Size of areas:* 5 to 50 acres

*Slope range:* 5 to 12 percent

*Parent material:* Silty mantle over residuum from interbedded shale and sandstone

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* High

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 40 to 60 inches or more

### ***Typical Profile***

*Surface layer:*

0 to 2 inch—brown silt loam

*Subsoil:*

2 to 8 inches—yellowish brown very friable silt loam

8 to 28 inches—yellowish brown friable silty clay loam

28 to 55 inches—strong brown and yellowish red friable clay loam

*Bedrock:*

55 to 60 inches—soft sandstone bedrock

***Contrasting Inclusions***

- Moderately deep Lily soils in positions similar to those of the Lonewood soil
- Moderately deep clayey soils in positions similar to those of the Lonewood soil

***Use and Management***

**Major uses:** Pasture and woodland

**Common woodland vegetation:** Oak-hickory type

**Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most climatically adapted crops can be grown.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.

**Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- Overgrazing reduces plant cover, adds to compaction, causes erosion, and encourages weed growth.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

**Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The low soil strength is a severe limitation affecting local roads and streets. This limitation may be overcome by providing suitable subgrade or base material.
- Structures should be designed to conform to the natural slope.

**Septic tank absorption fields**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Increasing the size of the septic tank absorption area helps to compensate for the slower percolation rate.
- Because of slope, septic tank absorption field lines should be installed on the contour.

***Interpretive Group***

*Land capability classification:* 3e

## **Pp—Pope-Philo complex, frequently flooded**

### ***Composition***

Pope soil and similar inclusions: 45 to 60 percent

Philo soil and similar inclusions: 40 to 55 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountain valleys

*Landform position:* Flood plains

*Shape of areas:* Long and narrow

*Size of areas:* 10 to 50 acres

*Slope range:* 0 to 3 percent

*Parent material:* Alluvium

### ***Soil Properties and Qualities***

*Drainage class:* Pope—well drained; Philo—moderately well drained

*Permeability:* Moderate

*Flood hazard:* Frequent

*Available water capacity:* Pope—high (more than 6 inches); Philo—low (2 to 4 inches)

*Depth to seasonal high water table:* More than 6 feet

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

#### **Pope**

*Surface layer:*

0 to 5 inches—dark brown very friable loam

*Subsoil:*

5 to 8 inches—dark yellowish brown very friable loam

8 to 43 inches—dark yellowish brown loam

*Substratum:*

43 to 60 inches—dark yellowish brown very gravelly sandy loam

#### **Philo**

*Surface layer:*

0 to 6 inches—brown very friable loam

*Subsoil:*

6 to 36 inches—dark yellowish brown friable loam

*Substratum:*

36 to 48 inches—yellowish brown friable fine sandy loam

48 to 60 inches—gray very friable gravelly sandy loam

### ***Contrasting Inclusions***

- Soils that have clay loam textures in the subsoil
- Small areas of Atkins soils

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Bottomland hardwoods

### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Seasonal flooding limits the production and harvesting of crops.
- Stones or cobbles on or near the soil surface limit tillage.

### **Pasture and hayland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Only hay and pasture plants that can tolerate periodic inundation and seasonal wetness should be seeded.
- Stones or cobbles on the soil surface limit many management practices.

### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The seedling mortality rate may be high in areas that are subject to flooding.
- Large amounts of rock fragments in the soil reduce the seedling survival rate. To overcome the higher mortality rate, larger trees can be planted or more trees than normal can be planted.
- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- These soils are not suited to dwellings because of the flooding.

### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- These soils are unsited to septic tanks absorption fields because of the flooding.

### ***Interpretive Group***

*Land capability classification:* 2w

## **RaC—Ramsey-Rock outcrop complex, 5 to 12 percent slopes**

### ***Composition***

Ramsey soil and similar inclusions: 65 to 85 percent

Rock outcrop: 15 to 25 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Plateaus and mountains

*Landform position:* Narrow ridgetops

*Shape of areas:* Irregular

*Size of areas:* 10 to 200 acres

*Slope range:* 5 to 12 percent

*Parent material:* Sandstone residuum



### ***Properties and Qualities of the Ramsey Soil***

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Flood hazard:* None

*Available water capacity:* Very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 10 to 20 inches

### ***Typical Profile***

#### **Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown very friable channery sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

#### **Rock outcrop**

This part of the map unit consists of sandstone bedrock 2 to 20 feet across that protrudes as much as 4 feet above the soil surface.

### ***Contrasting Inclusions***

- Petros soils that weathered from shale; in positions similar to those of the Ramsey soil
- Soils that weathered from shale and have bedrock at a depth of more than 20 inches

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.
- Rock outcrops restrict cultivation in most areas.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- The low available water capacity reduces yields and limits the response of plants to fertilizer.
- Only plants that can withstand droughty conditions during the summer should be planted.
- Rock outcrops limit many management practices.

#### **Woodland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
- Trees are commonly subject to windthrow because the rooting depth is restricted by bedrock.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- Excavation is difficult because of rock outcrops and the limited depth to bedrock.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Rock outcrops and the limited depth to bedrock hinder the installation of septic tank absorption fields and restrict permeability.

***Interpretive Group***

*Land capability classification:* 6e

**RaD—Ramsey-Rock outcrop complex, 12 to 20 percent slopes**

***Composition***

Ramsey soil and similar inclusions: 65 to 85 percent

Rock outcrop: 15 to 25 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Plateaus and mountains

*Landform position:* Hillslopes

*Shape of areas:* Irregular

*Size of areas:* 10 to 100 acres

*Slope range:* 12 to 20 percent

*Parent material:* Sandstone residuum

***Properties and Qualities of the Ramsey Soil***

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Flood hazard:* None

*Available water capacity:* Very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 10 to 20 inches

***Typical Profile***

**Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown very friable channery sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

**Rock outcrop**

This part of the map unit consists of sandstone bedrock 2 to 20 feet across that protrudes as much as 4 feet above the soil surface.

***Contrasting Inclusions***

- Soils that have bedrock at a depth of more than 20 inches
- Soils that have more clay in the subsoil than the Ramsey soil

***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

**Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.
- Rock outcrops restrict cultivation in most areas.

**Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- The low available water capacity reduces yields and limits the response of plants to fertilizer.
- Only plants that can withstand droughty conditions during the summer should be planted.
- Rock outcrops limit many management practices.

**Woodland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
- Trees are commonly subject to windthrow because the rooting depth is restricted by bedrock.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- Excavation is difficult because of rock outcrops and the limited depth to bedrock.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Rock outcrops and the limited depth to bedrock hinder the installation of septic tank absorption fields and restrict permeability.

***Interpretive Group***

*Land capability classification: 6e*

**RaF—Ramsey-Rock outcrop complex, 20 to 50 percent slopes**

***Composition***

Ramsey soil and similar components: 65 to 85 percent

Rock outcrop: 15 to 25 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Plateaus and mountains

*Landform position:* Hillslopes

*Shape of areas:* Irregular

*Size of areas:* 10 to 200 acres

*Slope range:* 20 to 50 percent

*Parent material:* Sandstone residuum

***Properties and Qualities of the Ramsey Soil***

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Flood hazard:* None

*Available water capacity:* Very low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 10 to 20 inches

***Typical Profile***

**Ramsey**

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable loam

*Subsurface layer:*

2 to 4 inches—brown very friable loam

*Subsoil:*

4 to 10 inches—yellowish brown very friable fine sandy loam

10 to 16 inches—yellowish brown channery very friable sandy loam

*Bedrock:*

16 inches—hard sandstone bedrock

**Rock outcrop**

This part of the map unit consists of sandstone bedrock 2 to 20 feet across that protrude as much as 4 feet above the soil surface.

***Contrasting Inclusions***

- Petros soils on landforms similar to those of the Ramsey soil
- Soils that weathered from shale that have bedrock at a depth of more than 20 inches

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, depth to bedrock, and rock outcrops, this map unit is unsited to crops.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- The low available water capacity reduces yields and limits the response of plants to fertilizer.
- Only plants that can withstand droughty conditions during the summer should be planted.
- The slope and rock outcrops limit most management practices.

#### **Woodland**

*Suitability:* Unsited

*Management measures and considerations:*

- Constructing water bars or broad-based dips, which direct water and sediment away from roads and streams and into duff layers or filter strips, helps to prevent damage to roads and skid trails and the sedimentation of streams.
- Seeding cut and filled areas helps to establish a permanent cover of vegetation.
- Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the Ramsey soil.
- The slope and rock outcrops limit the use of equipment.
- Trees are commonly subject to windthrow because the rooting depth is restricted by bedrock.

#### **Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- Excavation is difficult because of rock outcrops and the limited depth to bedrock.
- The slope is a limitation affecting building site development.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Rock outcrops, the limited depth to bedrock, and the slope hinder the installation of septic tank absorption fields and restrict permeability.

### ***Interpretive Group***

*Land capability classification:* 7e

## **SeC—Sequoia silt loam, 5 to 12 percent slopes**

### ***Composition***

Sequoia soil and similar inclusions: 70 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountains

*Landform position:* Broad ridgetops and footslopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 25 acres

*Slope range:* 5 to 12 percent

*Parent material:* Residuum from shale

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Flood hazard:* None

*Available water capacity:* Low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*

0 to 2 inches—dark brown very friable silt loam

*Subsurface layer:*

2 to 5 inches—dark yellowish brown friable silt loam

*Subsoil:*

5 to 9 inches—yellowish brown friable silty clay loam

9 to 16 inches—strong brown firm silty clay

16 to 23 inches—strong brown firm channery silty clay

*Bedrock:*

23 to 33 inches—rippable shale

### ***Contrasting Inclusions***

- Gilpin soils that have less clay in the subsoil than the Sequoia soil
- Lily soils that have hard bedrock at a depth of less than 40 inches
- Ramsey soils that have hard bedrock at a depth of less than 20 inches

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The moderate soil depth, the low available water capacity, and the clayey subsoil with a moderately slow permeability are the main limitations affecting row crops.
- The soil has fair suitability for small grains.

#### **Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The moderate soil depth, the low available water capacity, and the clayey subsoil with a moderately slow permeability are limitations affecting pasture and hayland.

### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The clayey subsoil, moderately deep root zone, and low available water capacity are limitations affecting woodland.

### **Building site development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- The limited depth to bedrock and the clayey subsoil hinder installation and reduce the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 4e

## **SeD—Sequoia silt loam, 12 to 20 percent slopes**

### ***Composition***

Sequoia soil and similar inclusions: 80 to 90 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus and mountains

*Landform position:* Broad ridgetops and footslopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 25 acres

*Slope range:* 12 to 20 percent

*Parent material:* Residuum from shale

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Flood hazard:* None

*Available water capacity:* Low

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*

0 to 2 inches—dark brown very friable silt loam

*Subsurface layer:*

2 to 5 inches—dark yellowish brown friable silt loam

*Subsoil:*

5 to 9 inches—yellowish brown friable silty clay loam

9 to 16 inches—strong brown firm silty clay  
16 to 23 inches—strong brown firm channery silty clay

*Bedrock:*

23 to 33 inches—rippable shale

### ***Contrasting Inclusions***

- Gilpin soils that have less clay in the subsoil than the Sequoia soil
- Lily soils that have hard bedrock at a depth of less than 40 inches
- Ramsey soils that have hard bedrock at a depth of less than 20 inches

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The moderate soil depth, the low available water, and the clayey subsoil with a moderately slow permeability are limitations affecting row crops.
- The soil has fair suitability for small grains.
- Erosion is a severe hazard.

#### **Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The moderate soil depth, the low available water capacity, and the clayey subsoil with a moderately slow permeability are limitations affecting pasture and hayland.

#### **Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The clayey subsoil, moderately deep root zone, and low available water capacity are limitations affecting woodland.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

#### **Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- The limited depth to bedrock and the clayey subsoil hinder installation and reduce the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 6e

## **ShC—Shelocta silt loam, 5 to 12 percent slopes**

### ***Composition***

Shelocta soil and similar inclusions: 85 to 95 percent



### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Mountains and hilly uplands

*Landform position:* Side slopes and footslopes

*Shape of areas:* Irregular

*Size of areas:* 5 to 50 acres

*Slope range:* 5 to 12 percent

*Parent material:* Colluvium from sandstone and shale

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid, except the surface layer is less acid in limed areas

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—very dark brown very friable silt loam

*Subsurface layer:*

3 to 10 inches—yellowish brown friable silt loam

*Subsoil:*

10 to 21 inches—yellowish brown friable silty clay loam

21 to 65 inches—yellowish brown friable channery silty clay loam

*Bedrock:*

65 to 75 inches—rippable shale

### ***Contrasting Inclusions***

- The moderately deep Gilpin soils
- Soils that have stones on the surface; in drainageways
- Rock outcrops on the upper side slopes

### ***Use and Management***

**Major uses:** Woodland and pasture

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The risk of erosion can be reduced by using practices that include minimum tillage, planting legumes and grasses in the rotation, maintaining crop residue on the surface, and using other erosion-control practices. Site-specific recommendations are needed.
- Because of the coarse fragments in the surface layer, seedbed preparation is difficult.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by rotating grazing, mowing and clipping, applying fertilizer and lime, and avoiding overgrazing.

**Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forest management.
- Undesirable plants may prevent adequate reforestation by seedlings unless intensive site preparation and maintenance are used.

**Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Structures should be designed to conform to the natural slope.

**Septic tank absorption fields**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Because of the slope, septic tank absorption field lines should be installed on the contour.

***Interpretive Group***

*Land capability classification:* 3e

**ShD—Shelocta silt loam, 12 to 20 percent slopes**

***Composition***

Shelocta soil and similar inclusions: 85 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Mountains and hilly uplands

*Landform position:* Side slopes and footslopes

*Shape of areas:* Irregular

*Size of areas:* 10 to 100 acres

*Slope range:* 12 to 20 percent

*Parent material:* Colluvium from sandstone and shale

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

***Typical Profile***

*Surface layer:*

0 to 3 inches—very dark brown very friable silt loam

*Subsurface layer:*

3 to 10 inches—yellowish brown friable silt loam

*Subsoil:*

10 to 21 inches—yellowish brown friable silty clay loam

21 to 65 inches—yellowish brown friable channery silty clay loam

*Bedrock:*

65 to 75 inches—rippable shale

***Contrasting Inclusions***

- Small areas of Bouldin soils
- Rock outcrops on the upper side slopes
- Small areas of soils that have bedrock at a depth of less than 40 inches

***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-hickory type

**Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The severe erosion hazard due to the slope is a limitation affecting row crops.

**Pasture and hayland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by rotating grazing, mowing and clipping, and applying fertilizer and lime.

**Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- The slope is a limitation affecting forest management.
- Roads and landings can be protected from erosion by constructing diversions and water turnouts and by seeding cuts and fills.
- Carefully managing reforestation after harvest helps to reduce plant competition.

**Building site development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- Structures should be designed to conform to the natural slope.
- The slope hinders the construction of streets and roads.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the slope, the lines of septic tank absorption fields should be installed on a better suited soil.

***Interpretive Group***

*Land capability classification:* 4e

## **ShE—Shelocta silt loam, 20 to 35 percent slopes**

### ***Composition***

Shelocta soil and similar inclusions: 85 to 95 percent

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Mountains and hilly uplands

*Landform position:* Side slopes and footslopes

*Shape of areas:* Irregular

*Size of areas:* 10 to 100 acres

*Slope range:* 20 to 35 percent

*Parent material:* Colluvium from sandstone and shale

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—very dark brown very friable silt loam

*Subsurface layer:*

3 to 10 inches—yellowish brown friable silt loam

*Subsoil:*

10 to 21 inches—yellowish brown friable silty clay loam

21 to 65 inches—yellowish brown friable channery silty clay loam

*Bedrock:*

65 to 75 inches—rippable shale

### ***Contrasting Inclusions***

- Small areas of Bouldin soils
- Rock outcrops on the upper side slopes
- Small areas of soils that have bedrock at a depth of less than 40 inches

### ***Use and Management***

**Major uses:** Woodland

**Common woodland vegetation:** Oak-hickory type

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- Because of the very severe erosion hazard on moderately steep to very steep slopes, this soil is unsited to row crops.

#### **Pasture and hayland**

*Suitability:* Unsited

*Management measures and considerations:*

- Management is difficult because of the slope.

**Woodland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Water turnouts, water bars, or broad-based dips, which direct water and sediment away from roads and streams, should be constructed on roads and skid trails.
- Water and sediment should be directed into duff layers or filter strips.
- Cuts and fills should be seeded to permanent cover.
- The slope limits the use of equipment.
- Carefully managing reforestation after harvest helps to reduce plant competition.

**Building site development**

*Suitability:* Unsited

*Management measures and considerations:*

- The slope greatly hinders building structures; a site should be selected on a better suited soil.
- The slope hinders the construction of streets and roads.

**Septic tank absorption fields**

*Suitability:* Unsited

*Management measures and considerations:*

- Septic tank absorption lines should be installed on a less sloping included soil, or a site should be selected on a better suited soil.

***Interpretive Group***

*Land capability classification:* 6e

**W—Water**

This map unit consists of areas inundated with water for most of the year and several small lakes, ponds, and other small bodies of water that are scattered throughout Morgan County. The major rivers include the Emory and Obed Rivers.

This map unit is not assigned any interpretive groups.

**WrB—Wernock silt loam, 2 to 5 percent slopes**

***Composition***

Wernock soil and similar inclusions: 70 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateaus

*Landform position:* Broad ridgetops

*Shape of areas:* Irregular

*Size of areas:* or

*Slope range:* or 2 to 5 percent

*Parent material:* or Residuum from shale

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

### ***Typical Profile***

*Surface layer:*

0 to 2 inches—dark grayish brown very friable silt loam

*Subsurface layer:*

2 to 12 inches—yellowish brown very friable silt loam

*Subsoil:*

12 to 35 inches—yellowish brown friable silty clay loam

*Bedrock:*

35 to 45 inches—rippable shale

### ***Contrasting Inclusions***

- Lonewood soils that have bedrock at a depth of more than 40 inches
- Soils that have soft sandstone at a depth of 20 to 40 inches

### ***Use and Management***

**Major uses:** Hay and pasture

**Common woodland vegetation:** Oak-pine type

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.
- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by the low soil fertility.

#### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

#### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

***Interpretive Group***

*Land capability classification:* 2e

**WrC—Wernock silt loam, 5 to 12 percent slopes**

***Composition***

Wernock soil and similar inclusions: 70 to 95 percent

***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape:* Rolling to hilly plateau

*Landform position:* Broad ridgetops

*Shape of areas:* Irregular

*Size of areas:* 5 to 25 acres

*Slope range:* 5 to 12 percent

*Parent material:* Residuum from shale

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Flood hazard:* None

*Available water capacity:* Moderate

*Seasonal high water table:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

***Typical Profile***

*Surface layer:*

0 to 2 inches—dark grayish brown very friable silt loam

*Subsurface layer:*

2 to 12 inches—yellowish brown very friable silt loam

*Subsoil:*

12 to 35 inches—yellowish brown friable silty clay loam

*Bedrock:*

35 to 45 inches—rippable shale

***Contrasting Inclusions***

- Lonewood soils that have bedrock at a depth of more than 40 inches
- Soils that have soft sandstone at a depth of 20 to 40 inches

***Use and Management***

**Major uses:** Hay and pasture

**Common woodland vegetation:** Oak-pine type

**Cropland**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Most crops respond to applications of lime and fertilizer.

## Soil Survey of Morgan County, Tennessee

- The risk of erosion can be reduced by using practices that include minimum tillage, maintaining crop residue on the surface, planting legumes and grasses in the rotation, and using other erosion-control practices. Site-specific recommendations are needed.
- The limited depth to bedrock reduces the amount of water available to plants.

### **Pasture and hayland**

*Suitability:* Well suited

*Management measures and considerations:*

- The quality and quantity of forage can be maintained by fertilizing, mowing and clipping, and avoiding overgrazing.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- Reforestation is limited mainly by low soil fertility.
- The survival rate of tree seedlings is less on the drier, south-facing slopes.

### **Building site development**

*Suitability:* Moderately suited

*Management measures and considerations:*

- Excavation is hindered by the limited depth to bedrock.

### **Septic tank absorption fields**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The limited depth to bedrock hinders installation and reduces the percolation rate.

### ***Interpretive Group***

*Land capability classification:* 3e



# Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to help locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Environmental officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify some of the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

### Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *slightly limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

### Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact

on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

## **Crops and Pasture**

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 2002, according to the U.S. Census of Agriculture, approximately 29,514 acres, or 7.7 percent, of Morgan County was used for crops and pasture. Of the total cropland acres, 11,863 acres were used exclusively for pasture, hayland, grass silage, and green chop. The rest was used for rotational cropland, including hay, pasture, small grains, tobacco, and row crops. In 2002, 67,619 pounds of tobacco and 2,480 bushels of soybeans were harvested in Morgan County.

The soils of Morgan County are suited to the county's commonly grown crops—corn and tobacco. Less sloping areas of moderately deep to very deep, well drained soils, such as Lily, Lonewood, and Wernock soils, are well suited to most row crops. The more sloping areas of Lily, Gilpin, Wernock, Hendon, Lonewood, and Shelocta soils are commonly used for hay and pasture.

The soils in Morgan County are better suited to pasture than to row crops. Many of the soils are too steep for intensive row cropping. Crops yields could be increased by applying the latest crop production technology to all cropland in the county. This soil survey can help facilitate the application of such technology.

The management systems needed on cropland are those that protect or improve the soil, help to control erosion, and minimize the pollution of water by nutrients, soil particles, and pesticides carried by runoff. Soil erosion is a major hazard on most of the soils used for crops or pasture in the county. It is a hazard where slopes are more than 2 percent. Lily, Wernock, Sequoia, and Lonewood soils are examples of soils that have slopes of more than 2 percent. As the slope increases, the hazard of erosion and the difficulty in controlling erosion also increase.

The loss of soil through erosion is damaging for several reasons. When the surface of a soil is lost, most of the available plant nutrients and organic matter are lost, the root zone becomes thinner, and the amount of available water is reduced, thus decreasing productivity and yields. Controlling erosion limits the amount of pollutants, such as pesticides, sediment, and nutrients, that may enter ponds, rivers, and streams. In addition to improving water quality and soil quality, controlling erosion reduces the amount of sandstone bedrock exposure in fields that are subject to high amounts of erosion.

Wetness is a management concern on a small amount of the acreage in the county used for crops and pasture. Areas of Atkins soils are poorly drained and rarely used for crop production.

Many of the soils in the county are extremely acid to slightly acid unless limed. Applications of ground limestone are needed to raise the pH level sufficiently for the production of some crops. Most soils in the county also respond to applications of commercial fertilizer. Additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, and a realistic yield expectation. The Cooperative

Extension Service can test soils, provide soil test results, and make recommendations for the type and amount of fertilizer and lime to apply.

From 1997 to 2002, the number of farms raising broilers or meat type chickens has nearly doubled, from 278,002 to 421,968. In 2002, there were approximately 10,086 cows and calves in Morgan County (7). The majority of the hay and pasture in the county is a mixture of grasses and legumes. Much of the hay is grown in rotation with pasture. The main grasses are tall fescue, orchardgrass, and timothy. The most common legumes are white clover, red clover, alfalfa, annual lespedeza, and sericea lespedeza. Legumes should be included in the seeding mixture when establishing pasture. The majority of the hay that is harvested is the surplus growth of grass-legume pastures. Hay should be cut at the stage of growth that provides the best quality feed and does not damage the grass-legume stand. The less sloping, deep and very deep, well drained soils should be planted with the highest-producing crops, such as corn silage, alfalfa, orchardgrass, and timothy. To aid in minimizing erosion, sod-forming grasses such as tall fescue should be planted on the steeper sloping soils. The areas of poorly drained soils, such as Atkins soils, should be planted in tall fescue and white clover.

### **Yields per Acre**

The average yields per acre that can be expected of the principal crops grown under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide more information about the management and productivity of the soils for those crops.

### **Land Capability Classification**

Land capability classification shows, in a general way, the suitability of soils for production of field crops (13). Crops that require special management are excluded. The soils are grouped according to their limitations for crop production, the risk of damage by erosion if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major landshaping that would change slope, depth, or other characteristics of the soils, nor do they include major reclamation projects. Capability classification is not an interpretation designed to show suitability and limitations of groups of soils for forestry, for engineering, or for environmental or residential purposes.

## Soil Survey of Morgan County, Tennessee

In the capability system, soils are generally grouped at two levels—capability class and subclass.

*Capability classes*, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them unsuitable for cultivation and that restrict their use mainly to pasture, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that are unsuited for commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

*Capability subclasses* are soil groups within one class. They are designated by

Slope ranges from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the survey area has been the loss of prime farmland to industrial and residential uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, less productive, and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 7. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. Their location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

## Forest Productivity and Management

Generally all of Morgan County was at one time was forested. Presently, woodland comprises approximately 294,360 acres, or 88 percent, of the land area in the county. About 241,040 acres of the woodland is privately owned, and approximately 53,320 acres is in State forests or national recreational areas.

Large areas of the woodland are on the steeper mountainsides and in deep gorges in the Cumberland Mountains portion of the county. Soils in these areas range from very deep stony soils to moderately deep or shallow soils underlain by shale bedrock. Bouldin, Gilpin, and Petros soils are the dominant soils in these areas. The steep and very steep side slopes, large stones, and depth to bedrock are limitations affecting woodland. The soils generally are covered by a mixture of red oak, yellow-poplar, hickory, and sugar maple. White pine and eastern hemlock are prevalent in the deep gorges and moist coves on the mountainsides.

Other areas of woodland are located on the rolling to hilly areas of the Cumberland Plateau portion of Morgan County. Soils are generally moderately deep to very deep, are underlain by sandstone and shale bedrock, and are infertile. Wernock, Lily, Gilpin, and Lonewood soils are the dominant soils in these areas. Many areas on the plateau are planted in loblolly pine, which is used in pulpwood production.

A small acreage of highly productive woodland is on flood plains in the county. Very deep, well drained soils, such as Allegheny and Pope soils, are dominant in these areas. Yellow-poplar, basswood, hemlock, white pine, and red maple are the dominant trees. The dominant forest type is oak-hickory. Important associated forest types include loblolly pine-shortleaf pine and oak-pine. The woodland in Morgan County is valuable not only for timber and pulpwood production but also for wildlife habitat, recreation, natural beauty, erosion control, and watershed protection.

The tables in this section can help forest owners or managers plan the use of soils for timber production. They show the potential productivity of the soils and rate the soils according to the limitations that affect various aspects of forest management.

### Forest Productivity

In table 8, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees are those that forest managers generally favor in intermediate or improvement cuttings and are selected on the basis of soil suitability, growth rate, quality, value, and current marketability. More detailed information regarding site index is available in the "National Forestry Manual" (11), which is

available at the local office of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

*Trees to manage* are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

### Forest Management

In table 9, parts I through V, interpretive ratings are given for various aspects of forest management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming these unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for fire damage, utilized in substory management, and seedling mortality are expressed as *low*, *moderate*, and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual" (11), which is available at the local office of the Natural Resources Conservation Service or on the Internet.

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forestry equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the



soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance; and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately well suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table or bedrock, soil reaction, available water capacity, soil

moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

## Recreation

Hunting and fishing are common outdoor recreational activities in Morgan County. The abundant wooded areas provide good habitat for deer, squirrel, and wild turkey. Some landowners lease areas for hunting upland game, primarily deer. Crop fields and meadows provide excellent cover for quail, morning dove, rabbit, and deer.

The Obed and Emory Rivers and their tributaries provide ample opportunities for fishing, canoeing, and kayaking. The Obed National Wild and Scenic River Area is managed by the National Park Service. It includes parts of the Obed River, Daddys Creek, Clear Creek, and the Emory River and offers hiking, camping, fishing, kayaking, and rock climbing.

The Frozen Head State Park and Natural Area, which is made up of approximately 11,876 acres, was acquired in the early 1900's for hardwood timber production but very little was actually harvested. This land was originally part of the Brushy Mountain State Penitentiary Property but was turned over to the Department of Agriculture in 1933 and named Morgan State Forest. It became a residential and work area for members of the Civilian Conservation Corps. The park was named for the many peaks it encompasses that are snow- or ice-capped in winter. It offers 60 miles of hiking trails, camping, and seasonal trout fishing (4).

The Catoosa Wildlife Management Area consists of approximately 79,000 acres, about 39,000 acres of which are located in Morgan County. It is managed by the Tennessee Wildlife Resources Agency and provides a large area for hunting, fishing, kayaking, canoeing, and hiking (5).

The soils of the survey area are rated in table 10, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season



when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

*Camp areas* require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a fragipan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a fragipan, permeability, and toxic substances in the soil.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a fragipan, permeability, and toxic substances in the soil.

*Playgrounds* require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a fragipan, permeability, and toxic substances in the soil.

*Paths and trails* for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

*Off-road motorcycle trails* require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

*Golf fairways* are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a fragipan; the available water capacity in the upper 40

inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

## Wildlife Habitat

Michael E. Zeman, Biologist, Natural Resources Conservation Service, helped prepare this section.

Wildlife is an important natural resource in the Morgan County. It provides a source of revenue through recreational opportunities, such as sport hunting, photography, and fishing. Popular game species include bobwhite quail, whitetail deer, eastern wild turkey, cottontail rabbit, mourning dove, ruffed grouse, gray squirrel, and fox squirrel.

The whitetail deer is the most popular game animal in the county. Deer populations are moderate and have grown considerably over the past 30 years. Harvest records from the Tennessee Wildlife Resources Agency (TWRA) indicate that approximately 100 deer were harvested in 1974, with just less than 1,200 harvested in 2004. The highest populations of deer in the county are likely to occur where hardwood ridges of mixed white oak and red oak are interspersed with grain crops, where cropland fields have winter covers of wheat or cereal ryes, and where grasslands are managed with clovers.

The eastern wild turkey was eliminated from the county by the 1950's but has been reintroduced. Huntible populations are now available due to the TWRA restoration program and management of the habitat. In 2004, 275 birds were harvested. Based on harvest records, the turkey population has remained essentially unchanged from 2003 to 2004.

Small game species recognized as edge or early successional species, including bobwhite quail, mourning dove, and cottontail rabbit, have low populations in the county. The highest concentrations of bobwhite quail occur where cropland is adjacent to brushy fencerows or in idle areas of native warm-season grasses and hard seed-producing annual plants. The mourning dove is both a resident and migrant, with the highest numbers occurring in the fall around grain-producing crop fields. The cottontail rabbit most commonly inhabits agricultural areas intermixed with low brushy cover and native warm-season grasses.

The ruffed grouse is fairly common in the larger blocks of hardwood ridges of the county, where development and expansive conversion to loblolly pines has not occurred. The highest concentrations occur where early successional stages of hardwood forest, intermixed with mature hardwoods, provide better brood foraging habitat and winter escape cover.

There are three species of squirrels in the county and all occur in good numbers. Both the gray squirrel and the primarily nocturnal southern flying squirrel occur in good to excellent numbers throughout the hardwood forests of the county. The fox squirrel generally lives along woodland edges and woody fencerows near agricultural areas. Squirrel populations can vary significantly from year to year depending on the production of hard mast, such as acorns, hickory nuts, and beechnuts.

Waterfowl numbers are considered low in the county due to the limited extent of wetlands, agricultural fields, and the distance from principal flyways. The most common species migrating through the county include wood duck, mallard, and blue-winged teal. These species utilize farm ponds and small lakes for resting and roosting. The wood duck and resident greater Canada goose frequently use farm ponds in the spring where nesting habitat is available. Several species of furbearers occur in the county. Wetland furbearers include mink, muskrat, and beaver. They can be found in moderate numbers along sluggish streams, small lakes, and farm ponds. Upland furbearers are common throughout the county and include bobcat, opossum, raccoon, gray fox, striped skunk, and coyote.

Many non-game species occur in abundance throughout the county. Various species of songbirds, both resident and migratory, are associated with different plant communities. Common woodland birds include the Carolina chickadee, tufted titmouse, pileated woodpecker, and warblers. Common openland birds include robins, meadowlarks, and various sparrows. Common birds of prey include the red-tailed hawk, sparrow hawk, barred owl, and screech owl. Common reptiles and amphibians include the eastern box turtle, rat snakes, copperhead snakes, bullfrogs, and woodland salamanders. Common small mammals include the hispid cotton rat, moles, voles, shrews, and other rodents. The relative abundance of non-game species is dependent upon the type and quality of the habitat available to the species.

State and federally listed threatened or endangered wildlife species that may occur in the county include several species of mussels such as the Cumberland Elktote, fish, and several species of plants. Many of the plants, such as Cumberland rosemary and Cumberland sandwort, are associated with the Cumberland Mountains portions in the county.

The county has many constructed farm ponds that are commonly for livestock use but that provide recreational opportunities because they have been stocked with fish. Common fish species that are stocked include largemouth bass, bluegill sunfish, redear sunfish, and channel catfish. The water in ponds is typically acidic due to the pH of the soil and, as a result, the production of fish may be limited. A few privately owned ponds are being intensively managed for a high production of fish. Almost all of the soils in the county are very limited for pond construction due to soil steepness, depth to bedrock, or seepage problems. The best soils for pond construction are Gilpin, Lonewood, and Wernock soils in areas where slopes are less than 12 percent and where depth to bedrock is deepest.

Morgan County has a total of approximately 248 miles of warm-water streams. Major streams of the county and tributaries to the Cumberland River include Bone Camp Creek and the Clear Fork of the New River. Major tributaries to the Tennessee River are Clear Creek, Daddys Creek, and the Emory River. These and other streams provide about 1,415 acres of aquatic habitat and support populations of largemouth bass, smallmouth bass, rock bass, bluegill, green sunfish, channel catfish, and several species of minnows and darters.

Excluding artificial wetlands, such as shallow water zones of upland farm ponds, there are very few wetlands in the county. Only one hydric soil, Atkins silt loam, frequently flooded, is listed for the county. There are approximately 330 acres in the county mapped as this soil. In a natural state, the wetlands on Atkins soils would be forested. Many of these areas were converted to pastureland years ago, but the few areas remaining as bottomland hardwoods provide some of the most productive wildlife habitat in the county. Bottomland hardwoods are considered valuable for improving the water quality of streams by removing nutrients and trapping sediments from upland runoff, by lowering water temperatures through shading, and by providing leaf litter that serves as the foundation for aquatic food chains.

Morgan County has thousands of acres of publicly owned land designated for wildlife and available for public use. The Obed National Wild and Scenic River Area includes parts of the Obed River, Daddys Creek, Clear Creek, and the Emory River and consists of more than 45 miles of forested gorges and streams managed by the National Park Service. Frozen Head State Park consists of 11,876 acres. A large portion of the 80,000-acre Catoosa Wildlife Management Area also lies within the county. Much of this public land consists of mountain forests of the Cumberland Mountains (4, 5).

Conservation practices improve or provide quality wildlife habitat. On cropland, planned crop rotations and crop residue management provide food and winter cover for many species of wildlife. On grasslands, deferred grazing of livestock and fencing help to protect food plots and nesting cover as well as fish habitat (by providing

streambank protection). Field borders, filter strips, and forested riparian buffers along streams help to protect water quality and provide food, cover, and travel lanes for many species of wildlife. Native warm-season grasses can provide excellent nesting and other benefits when selected for use in field borders and filter strips. Selective thinning of woodlands can be carried out in a manner that protects den trees and the better mast-producing trees. Other practices that can improve wildlife habitat include upland wildlife habitat management, wildlife wetland habitat management, early successional habitat development and management, fish pond management, prescribed grazing, livestock exclusion, and woodland improvement. Conversely, some conservation practices can be harmful to wildlife. Those most often include indiscriminate burning, indiscriminate use of pesticides, heavy grazing, complete mowing during the nesting season, clean fall plowing, extensive clearcutting of timber, draining and clearing of wetlands, and removal of den and all mast-producing trees.

Technical assistance in the planning or application of wildlife conservation practices can be obtained from the Natural Resources Conservation Service; the University of Tennessee, Agricultural Extension Service; the Tennessee Wildlife Resources Agency; and the Tennessee Division of Forestry.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are tall fescue, bermudagrass, orchardgrass, ladino clover, annual lespedeza, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are

depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are tall bluestem, goldenrod, beggarweed, panicum, carpetgrass, switchgrass, greenbrier, and eastern grama.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, yellow-poplar, wild cherry, sweetgum, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn olive, and crabapple.

*Coniferous plants* furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the rooting zone, available water capacity, and wetness. Examples of coniferous plants are pine and eastern redcedar.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, cattails, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, groundhog, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, opossum, skunk, and whitetail deer.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, blue heron, shore birds, muskrat, otter, mink, and beaver.

## Engineering

This section provides information for planning land uses related to urban and residential development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils have been included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite*



*investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

State ordinances and local regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Complying with local ordinances and regulations should be a consideration in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock, soil wetness, depth to a water table, ponding, slope, flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

In a general way, this information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, fill material, and topsoil; plan drainage systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations about the soils in this survey area, depending upon the use intended and the degree of confidence required.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

### **Building Site Development**

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction modifications, performance after construction, and maintenance. Table 12, parts I and II, show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

*Dwellings* are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a fragipan, hardness of bedrock or a fragipan, and the amount and size of rock fragments.

*Small commercial buildings* are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a fragipan, hardness of bedrock or a fragipan, and the amount and size of rock fragments.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder (tar). The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a fragipan, hardness of bedrock or a fragipan, and the amount and size of rock fragments. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), linear extensibility (shrink-swell potential), depth to a water table, and ponding or flooding.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a fragipan, hardness of bedrock or a fragipan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established.

## Sanitary Facilities

Table 13, parts I and II, show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfills. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health concerns. Permeability, depth to a water table, ponding, depth to bedrock or a restrictive layer, and flooding affect absorption of the effluent. Stones and boulders, hard bedrock, or a dense fragipan interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent in downslope areas in addition to installation difficulties.

Some soils are underlain by loose sand, gravel, or highly fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated or seepage may occur in downslope areas.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a fragipan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is very severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard in karst landscapes, if highly fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overflows the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and fragipans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and



the soil material must be thick enough over bedrock or a fragipan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a fragipan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, an onsite investigation is needed.

Hard bedrock, creviced bedrock, or highly fractured rock strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a fragipan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if highly fractured bedrock, or a water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils or in fractured bedrock layers in the steeper areas and cause seepage problems.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained off-site, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. Some of these properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area

must be thick enough over bedrock or any root-restricting layer to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

### Construction Materials

Table 14, parts I and II, give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good*, *fair*, or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the table. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

The soils are rated as a *good*, *fair*, or *poor* source of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

*Sand* and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In this table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

*Reclamation material* is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence in such a way that the reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined or borrowed areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion, the stability of the surface and subsoil, and the productive potential of the reconstructed soil. Some of these properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; content of organic matter; and other features that dominantly affect fertility and productivity.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

*Topsoil* is used to cover an area so that vegetation can be established and

maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

### **Water Management**

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *not limited* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *somewhat limited* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *very limited* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

*Aquifer-fed excavated ponds* are pits that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.



# Soil Properties

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Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in the tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

## Engineering Index Properties

Table 16 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

*Depth* to the upper and lower boundaries of each layer is indicated in inches.

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in a mass of the soil. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of gravel is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional

refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

*Rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

## Physical and Chemical Properties

Table 17 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated in inches.

sedimentation, sieving, or micrometric 5. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering, agronomic, residential, and commercial interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moist.7()16.8(.)54.8( )44.9(The)16.8(y influence shr)-19.2(ink) properties. The amount and kind of clay in a soil also affect tillage, root penetration, and earthmoving operations.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 17, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*ulk density* is the weight of soil (oven dry) per unit volume. Volume is

when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, depth to bedrock or a restrictive layer, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility*



## Water Features

Table 18 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

*Water table* refers to a saturated zone in the soil. Table 18 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely gray colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

*Flooding* is the temporary inundation of an area caused by overflowing streams or rivers, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

*Duration* and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; little or no horizon development; and records from local and flood-gauging stations.



Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historically recorded floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

## Soil Features

Table 19 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical and chemical properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable rooting environment. Examples are bedrock, fragipans, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

*Potential for frost action* is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.



# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (10, 12). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

**SUBGROUP.** Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, clay activity, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, semiactive, mesic Typic Hapludults.

**SERIES.** The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in

the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (8). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (12) and in "Keys to Soil Taxonomy" (10). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

## Allegheny Series

The Allegheny series consists of very deep, well drained soils that formed in loamy alluvium. These gently sloping soils are on low stream terraces in the Cumberland Plateau and Mountains. Slopes range from 0 to 3 percent.

Typical pedon of Allegheny loam in an area of Allegheny-Cotaco complex, occasionally flooded; in Scott County, Tennessee; on a stream terrace 125 feet southwest of the Adkins Cemetery at the mouth of Phillip Adkins Hollow, 3.3 miles south of the intersection of Lower Jellico Creek Road and Gum Flats Road at the community of Ketchen; lat. 36 degrees 32 minutes 06 seconds N. and long. 84 degrees 20 minutes 51 seconds W.; USGS Ketchen Quadrangle:

Ap—0 to 6 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; few fine roots; moderately acid; gradual smooth boundary.

BE—6 to 10 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; few fine roots; few fine tubular pores; strongly acid; gradual smooth boundary.

Bt1—10 to 24 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—24 to 39 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores and few vesicular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—39 to 45 inches; yellowish brown (10YR 5/4) gravelly clay loam; weak fine subangular blocky structure; friable; many fine and medium tubular pores; 15 percent fragments of sandstone as much as 2 inches across; strongly acid; clear smooth boundary.

C—45 to 60 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; massive; very friable; 30 percent fragments of sandstone as much as 3 inches across; very strongly acid.

The thickness of the solum ranges from 30 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of sandstone fragments ranges from 0 to 15 percent in the A horizon, from 0 to 30 percent in the Bt horizon, and from 0 to 35 percent in the BC and C horizons. Reaction typically is strongly acid or very strongly acid. The surface layer is less acid in limed areas.

The Ap horizon has hue of 10YR and value and chroma of 3 or 4. Texture typically is loam. In places, it is silt loam.

The BA or BE horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is loam or clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Texture is loam or clay loam. Some pedons display redoximorphic features in shades of brown below a depth of 24 inches.

The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. Some pedons display redoximorphic features in shades of brown, yellow, or gray below a depth of about 40 inches. The fine-earth texture is loam, clay loam, fine sandy loam, or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6.

Brown or gray redoximorphic features are none or common. The fine-earth texture is sandy loam, fine sandy loam, or loam.

## Atkins Series

The Atkins series consists of very deep, poorly drained soils that formed in mixed alluvium weathered from shale and sandstone. These nearly level soils are on flood plains and in depressions along major streams and rivers that drain the Cumberland Plateau and Mountains. Slopes range from 0 to 3 percent.

Typical pedon of Atkins silt loam, frequently flooded; in Scott County, Tennessee; on the flood plain of Roaring Paunch Creek, about 400 feet west of Alderville Road and 0.4 mile south of the intersection of Pleasant Grove Road and Alderville Road, about a mile south of the community of Pleasant Grove; lat. 36 degrees 33 minutes 57 seconds N. and long. 84 degrees 24 minutes 26 seconds W.; USGS Winfield Quadrangle:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; moderate medium granular structure; friable; many fine and very fine roots; many prominent reddish brown (5YR 4/4) iron accumulations lining root channels; moderately acid; clear smooth boundary.

Bg1—6 to 24 inches; light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; friable; common fine roots; many prominent reddish brown (5YR 4/4) iron accumulations lining root channels; few fine manganese concretions; very strongly acid; gradual smooth boundary.

Bg2—24 to 36 inches; gray (10YR 6/1) silt loam; weak coarse subangular blocky structure; friable; common very fine roots; common prominent reddish brown (5YR 4/4) iron accumulations lining root channels and infused into the matrix; few fine manganese concretions; very strongly acid; gradual smooth boundary.

Bg3—36 to 46 inches; light gray (10YR 7/1) silty clay loam; weak coarse subangular blocky structure; friable; few very fine roots; few manganese concretions; common medium prominent yellowish brown (10YR 5/6) iron accumulations infused into the matrix; very strongly acid; gradual smooth boundary.

Cg—46 to 62 inches; light gray (10YR 7/1) fine sandy loam; massive; friable; very strongly acid.

Thickness of the solum ranges from 25 to 50 inches, and depth to bedrock is more than 6 feet. The profile commonly has no rock fragments. Reaction typically is strongly acid or very strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Texture is loam or, in places, silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. Texture is silt loam, loam, clay loam, or silty clay loam. Redoximorphic features in shades of brown or red are common in most pedons.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In some pedons, it has redoximorphic features in shades of brown or red. Texture is loam, fine sandy loam, or sandy loam.

## Bethesda Series

The Bethesda series consists of very deep, well drained, sloping to very steep soils that formed in acid regolith from surface mining operations. Slopes range from 10 to 80 percent.

Typical pedon of Bethesda channery loam, 10 to 80 percent slopes; in Cumberland

County, Tennessee; on a reclaimed strip mine on a hillslope 300 feet southwest of Tennessee Highway 68 (Atlas Sheet 43), 1.3 mile south of the community of Grassy Cove; lat. 35 degrees 49 minutes 37 seconds N. and long. 84 degrees 54 minutes 14 seconds W.; USGS Grassy Cove Quadrangle:

- A—0 to 2 inches; dark grayish brown (10YR 4/2) channery loam; weak medium granular structure; friable; 20 percent shale and coal fragments less than 3 inches across; very strongly acid; clear smooth boundary.
- C1—2 to 23 inches; brown (10YR 4/3) very channery loam; massive; friable; 40 percent shale and coal fragments less than 3 inches across; very strongly acid; gradual smooth boundary.
- C2—23 to 38 inches; dark yellowish brown (10YR 4/4) very channery clay loam; massive; friable; 40 percent shale and coal fragments less than 3 inches across; strongly acid; gradual smooth boundary.
- C3—38 to 45 inches; yellowish brown (10YR 5/4) very channery loam; massive; friable; 50 percent shale fragments less than 3 inches across; very strongly acid; gradual smooth boundary.
- C4—45 to 60 inches; yellowish brown (10YR 5/4) channery loam; massive; friable; 25 percent sandstone fragments as much as 6 inches across; very strongly acid.

The depth to sandstone or shale bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 50 percent in the A horizon and from 35 to 80 percent in the C horizon. Fragments are commonly 2 to 38 cm in size but may include stones and boulders. Reaction typically ranges from strongly acid to extremely acid throughout the profile. The surface layer is less acid in reclaimed areas that have been limed.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6. The fine-earth texture is loam.

The C horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6. The fine-earth texture is loam, clay loam, silt loam, or silty clay loam.

## Bouldin Series

The Bouldin series consists of very deep, well drained soils that formed in colluvium weathered from acid sandstone. These steep and very steep soils are on convex side slopes and footslopes commonly below sandstone escarpments on the Cumberland Plateau and Mountains. Slopes range from 25 to 80 percent.

Typical pedon of Bouldin cobbly loam in an area of Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony; in Scott County, Tennessee; on a south-facing mountain slope along Capuchin Creek, 200 feet (airline) northeast of the intersection of Jellico Creek Road and Capuchin Creek Road, about 3 miles east of the community of Ketchen; lat. 36 degrees 34 minutes 32 seconds N. and long. 84 degrees 16 minutes 38 seconds W.; USGS Ketchen Quadrangle:

- A—0 to 2 inches; dark grayish brown (10YR 4/2) flaggy loam; weak fine granular structure; very friable; many fine medium and coarse roots; 25 percent sandstone fragments as much as 14 inches across; strongly acid; clear smooth boundary.
- BE—2 to 17 inches; yellowish brown (10YR 5/4) channery loam; weak fine subangular blocky structure; very friable; many fine, medium, and coarse roots; 30 percent sandstone fragments as much as 8 inches across; strongly acid; clear smooth boundary.
- Bt1—17 to 30 inches; yellowish brown (10YR 5/6) very channery loam; weak medium subangular blocky structure; friable; many fine and medium roots; few faint clay films; 50 percent sandstone fragments as much as 10 inches across; strongly acid; gradual smooth boundary.



- Bt2—30 to 42 inches; strong brown (7.5YR 5/6) extremely flaggy clay loam; weak medium subangular blocky structure; friable; few faint clay films; 60 percent rock fragments as much as 15 inches across; strongly acid; gradual smooth boundary.
- Bt3—42 to 80 inches; strong brown (7.5YR 5/6) extremely stony clay loam; weak medium subangular structure; friable; few faint clay films; 65 percent sandstone fragments as much as 24 inches across; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Sandstone fragments (channers, flagstones, or stones) make up 15 to 75 percent of the solum. Fragments in the upper part of the solum are dominantly less than 10 inches across while those in the lower part range to 24 inches. Reaction is strongly acid or very strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth texture is fine sandy loam or loam.

The BE horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The fine-earth texture is fine sandy loam or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth texture is loam or clay loam.

The BC horizon, if it occurs, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. The fine-earth texture is loam or clay loam. Some pedons display lithochromic mottles in shades of brown, red, or gray below a depth of about 40 inches.

## Cotaco Series

The Cotaco series consists of very deep, moderately well drained soils that formed in loamy alluvium. These gently sloping soils are on low stream terraces in the Cumberland Plateau and Mountains. Slopes range from 0 to 3 percent.

Typical pedon of Cotaco loam in an area of Allegheny-Cotaco complex, occasionally flooded; in Scott County, Tennessee; on a stream terrace 185 feet southwest of the Adkins Cemetery at the mouth of Phillip Adkins Hollow, 3.3 miles south of the intersection of Lower Jellico Creek Road and Gum Flats Road at the community of Ketchen; lat. 36 degrees 32 minutes 05 seconds N. and long. 84 degrees 20 minutes 51 seconds W.; USGS Ketchen Quadrangle:

- Ap—0 to 6 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; few fine roots; moderately acid; gradual smooth boundary.
- BE—6 to 10 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; few fine roots; few fine tubular pores; strongly acid; gradual smooth boundary.
- Bt1—10 to 24 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.
- Bt2—24 to 36 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores and few vesicular pores; few faint clay films on faces of peds; many medium distinct light brownish gray (10YR 6/2) iron depletions and common medium prominent strong brown (7.5YR 5/6) iron accumulations on faces of peds; strongly acid; gradual smooth boundary.
- BC—36 to 45 inches; yellowish brown (10YR 5/4) gravelly clay loam; weak fine subangular blocky structure; friable; many fine and medium tubular pores; many medium distinct light brownish gray (10YR 6/2) iron depletions and many medium prominent yellowish red (5YR 5/8) soft nodules of iron accumulation in the matrix; 25 percent sandstone fragments as much as 2 inches across; strongly acid; clear smooth boundary.

C—45 to 60 inches; 35 percent light brownish gray (10YR 6/2), 35 percent strong brown (7.5YR 5/6), and 30 percent yellowish brown (10YR 5/4) variegated very gravelly fine sandy loam; massive; very friable; common yellowish red (5YR 5/8) weakly cemented iron concretions and black (N 2.5/0) strongly cemented manganese concretions and stains throughout the matrix (the areas with light brownish gray colors are iron depletions and the areas with strong brown colors are iron accumulations); 40 percent sandstone fragments as much as 3 inches across; very strongly acid.

The thickness of the solum ranges from 30 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of sandstone fragments ranges from 0 to 30 percent in the solum and from 0 to 50 percent in the C horizon. Reaction typically is strongly acid or very strongly acid. The surface layer is less acid in limed areas.

The Ap horizon has hue of 10YR and value and chroma of 3 or 4. Texture is loam or silt loam.

The BE horizon or BA horizon (if it occurs) has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is loam or silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is loam, clay loam, or silty clay loam. Redoximorphic features are common below a depth of 24 inches.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. The fine-earth texture is loam, clay loam, fine sandy loam, or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 8. The fine-earth texture is sandy loam, fine sandy loam, or loam.

## Gilpin Series

The Gilpin series consists of moderately deep, well drained soils that formed in residuum weathered from shale and siltstone. These sloping to very steep soils are on side slopes and ridgetops on the Cumberland Plateau and Mountains. Slopes range from 5 to 80 percent.

Typical pedon of Gilpin silt loam in an area of Gilpin-Petros complex, 35 to 80 percent slopes; in Scott County, Tennessee; on a ridgetop about 100 feet northeast of Ridge Road, 0.3 mile east of the intersection of Brimstone Road and Ridge Road and about a mile southeast of the community of Robbins; lat. 36 degrees 20 minutes 37 seconds N. and long. 84 degrees 34 minutes 38 seconds W.; USGS Robbins Quadrangle:

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; very friable; many fine and medium roots; 5 percent shale channers as much as  $\frac{1}{2}$  inch across; strongly acid; abrupt smooth boundary.

BE—3 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; 5 percent shale channers as much as  $\frac{1}{2}$  inch across; strongly acid; gradual smooth boundary.

Bt1—6 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; 5 percent shale channers as much as  $\frac{1}{2}$  inch across; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—12 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; 10 percent shale channers as much as 1 inch across; common faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—21 to 25 inches; brownish yellow (10YR 6/6) channery silty clay loam; common fine and medium prominent yellowish red (5YR 5/6) and pale brown (10YR 6/3)



lithochromic mottles; weak medium subangular blocky structure; very friable; few fine and medium roots; 15 percent shale channers as much as 1 inch across; extremely acid; abrupt wavy boundary.

Cr—25 to 35 inches; rippable shale.

The thickness of the solum ranges from 18 to 36 inches. The depth to rippable bedrock is 20 to 40 inches. The content of shale channers ranges from 5 to 20 percent in the A and B horizons. Reaction typically ranges from strongly acid to extremely acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is loam or, in places, silt loam.

The BE horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 5. Texture is loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. Texture is silt loam, loam, or silty clay loam.

The BC horizon has colors and textures similar to those of the Bt horizon.

The Cr horizon is mostly rippable shale that grades to hard bedrock. It has many lithochromic mottles in shades of red and brown. Texture is loam or silty clay loam.

## Hendon Series

The Hendon series consists of very deep, well drained soils that formed in a loamy mantle 1 to 3 feet thick and the underlying residuum weathered from shale and sandstone. These gently sloping and sloping soils are on broad ridgetops and smooth side slopes on the Cumberland Plateau. Slopes range from 2 to 12 percent.

Typical pedon of Hendon silt loam, 2 to 5 percent slopes; in Morgan County, Tennessee; on a ridgetop 150 feet west of Tennessee Highway 299 and 800 feet northeast of the intersection of Deer Haven Road and Tennessee Highway 299, about 2 miles southwest of Pine Orchard; lat. 35 degrees 56 minutes 51 seconds N. and long. 84 degrees 40 minutes 31 seconds W.; USGS Cardiff Quadrangle:

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

BE—3 to 12 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure parting to weak medium granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; gradual smooth boundary.

Bt—12 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; few faint clay films; very strongly acid; clear wavy boundary.

2Btx—24 to 36 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/6) and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; brittle in 40 to 60 percent of the volume; few fine and very few medium roots; few faint clay films; 3 percent sandstone fragments as much as 1/2 inch across; very strongly acid; clear wavy boundary.

2Bt1—36 to 50 inches; yellowish red (5YR 5/8) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common discontinuous clay films on faces of peds; 3 percent sandstone fragments as much as 1/2 inch across; very strongly acid; gradual smooth boundary.

2Bt2—50 to 60 inches; red (2.5YR 4/6) clay loam; strong medium subangular blocky structure; friable; common continuous clay films on faces of peds; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction typically is very strongly or strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The Ap horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is silt loam or, in places, loam.

The BE horizon has colors and textures similar to those of the Bt horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. Texture is loam, silt loam, silty clay loam, or clay loam.

The 2Btx and 2Bt horizons have hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. Texture is loam or clay loam. Some pedons display mottles in shades of brown, yellow, or red. Gray mottles occur in a few pedons below a depth of about 30 inches.

## Jefferson Series

The Jefferson series consists of very deep, well drained soils that formed in colluvium weathered from acid sandstone and shale. These moderately steep and steep soils are on concave side slopes and footslopes along the border with Cumberland County. Slopes range from 20 to 50 percent.

Typical pedon of Jefferson cobbly loam in an area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, stony; in Cumberland County, Tennessee; on a footslope about 400 feet north of the Obed River and 100 feet west of Genesis Road, about a mile northeast of Catoosa Canyon; lat. 36 degrees 03 minutes 46 seconds N. and long. 84 degrees 57 minutes 43 seconds W.; USGS Fox Creek Quadrangle:

- A—0 to 1 inch; very dark grayish brown (10YR 3/2) cobbly loam; weak fine granular structure; very friable; common fine and medium roots; 20 percent sandstone gravel and cobbles as much as 8 inches across; strongly acid; abrupt smooth boundary.
- E—1 to 7 inches; yellowish brown (10YR 5/4) cobbly loam; weak fine granular structure; friable; common fine and medium roots; 20 percent sandstone gravel and cobbles as much as 8 inches across; strongly acid; clear smooth boundary.
- Bt1—7 to 17 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 30 percent sandstone gravel and cobbles as much as 8 inches across; strongly acid; gradual smooth boundary.
- Bt2—17 to 40 inches; yellowish brown (10YR 5/6) cobbly loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 30 percent sandstone gravel and cobbles as much as 8 inches across; strongly acid; gradual smooth boundary.
- Bt3—40 to 56 inches; yellowish brown (10YR 5/6) very cobbly clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 40 percent sandstone gravel and cobbles as much as 8 inches across; strongly acid; gradual smooth boundary.
- C—56 to 65 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; common medium distinct light yellowish brown (10YR 6/4) and common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; 50 percent sandstone gravel and cobbles as much as 5 inches across; strongly acid.

The thickness of the solum is more than 40 inches. The depth to hard bedrock is more than 60 inches. The content of sandstone fragments, mostly gravel and cobbles, ranges from 5 to 35 percent in the A and E horizons and in the upper part of the B horizon and from 20 to 80 percent in the lower part of the B horizon and in the C

horizon. Reaction typically is strongly acid or very strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. The fine-earth texture is loam.

The E and Bt horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. The fine-earth texture is loam or sandy loam in the E horizon and loam, sandy clay loam, or clay loam in the Bt horizon.

The C horizon has colors and textures similar to those of the Bt horizon. Lithochromic mottles in shades of brown, red, or gray are common.

## Lily Series

The Lily series consists of moderately deep, well drained soils that formed in residuum weathered from acid sandstone. These gently sloping to steep soils are on ridgetops and side slopes on the Cumberland Plateau and Mountains. Slopes range from 2 to 35 percent.

Typical pedon of Lily loam in an area of Lily-Ramsey complex, 5 to 12 percent slopes; in Scott County, Tennessee; on a ridgetop in the Scott State Forest, 1,000 feet northwest of the intersection of Bandy Creek Road and Tennessee Highway 297 (Leatherwood Road), about 1 mile by road northwest of the Leatherwood Ford on the South Fork of the Cumberland River; lat. 36 degrees 28 minutes 46 seconds N. and long. 84 degrees 40 minutes 54 seconds W; USGS Honey Creek Quadrangle:

- A—0 to 3 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.
- BE—3 to 9 inches; yellowish brown (10YR 5/4) loam; moderate medium granular structure; friable; many fine, medium, and coarse roots; very strongly acid; gradual smooth boundary.
- Bt1—9 to 18 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; few faint clay films on faces of pedis; very strongly acid; gradual smooth boundary.
- Bt2—18 to 30 inches; yellowish brown (10YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of pedis; very strongly acid; abrupt smooth boundary.
- R—30 inches; sandstone bedrock.

The thickness of the solum and the depth to hard sandstone bedrock range from 20 to 40 inches. The content of sandstone fragments ranges from 0 to 30 percent in the A and B horizons and is as much as 35 percent in the C horizon. Reaction typically is very strongly acid or strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Texture is loam.

The BE horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Texture is loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is loam or clay loam.

The BC or C horizon, if it occurs, has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. Texture is fine sandy loam, sandy loam, loam, or clay loam.

## Lonewood Series

The Lonewood series consists of deep and very deep, well drained soils that formed in a loamy mantle 1 to 3 feet thick and the underlying residuum weathered

from interbedded shale and sandstone. These gently sloping and sloping soils are on broad ridgetops and smooth side slopes on the Cumberland Plateau. Slopes range from 2 to 12 percent.

Typical pedon of Lonewood silt loam, 2 to 5 percent slopes; in Scott County, Tennessee; on a ridgetop in the Scott State Forest, 550 feet southwest of Bandy Creek Campground past the swimming pool by a trail, 1.25 miles northwest of the intersection of Bandy Creek Road and Tennessee Highway 297 (Leatherwood Road), about 2.3 miles by road northwest of the Leatherwood Ford on the South Fork of the Cumberland River; lat. 36 degrees 29 minutes 12 seconds N. and long. 84 degrees 41 minutes 31 seconds W.; USGS Honey Creek Quadrangle:

- A—0 to 2 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
- BE—2 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
- Bt1—8 to 20 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; few faint clay films; strongly acid; gradual smooth boundary.
- Bt2—20 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films; strongly acid; gradual smooth boundary.
- 2Bt3—28 to 37 inches; strong brown (7.5YR 4/6) clay loam; common medium prominent light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) lithochromic mottles; moderate medium subangular blocky structure; friable; few roots; common discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.
- 2Bt4—37 to 50 inches; strong brown (7.5YR 5/6) clay loam; few medium distinct yellowish brown (10YR 5/6) lithochromic mottles; moderate medium subangular blocky structure; friable; common discontinuous clay films; 5 percent sandstone fragments as much as 2 inches across; very strongly acid; gradual smooth boundary.
- 2BC—50 to 55 inches; yellowish red (5YR 5/8) clay loam; common medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) lithochromic mottles; weak coarse subangular blocky structure; friable; 10 percent sandstone fragments as much as 3 inches across; very strongly acid; abrupt smooth boundary.
- 2Cr—55 to 60 inches; weathered sandstone.
- 2R—60 inches; sandstone bedrock.

The thickness of the solum ranges from 40 to 65 inches. The depth to hard sandstone or shale bedrock ranges from 40 to more than 60 inches. Fragments of sandstone and shale that are less than 2 inches across make up 0 to 5 percent of the A, BE, and Bt horizons and 0 to 10 percent of the 2Bt and 2BC horizons. Reaction typically is very strongly acid or strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture is loam or, in places, silt loam.

The BE horizon or E horizon (if it occurs) has colors and textures similar to those of the Bt horizon.

The Bt horizon has hue of 10YR to 5YR, value of 5, and chroma of 4 to 8. Texture is loam, silt loam, silty clay loam, or clay loam. The 2Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. Most pedons display lithochromic mottles in shades of brown, yellow, and red. Texture is silty clay loam or clay loam.

The 2BC horizon has colors and textures similar to those of the lower part of the 2Bt horizon.

## Petros Series

The Petros series consists of shallow, excessively drained soils that formed in residuum weathered from interbedded shale and siltstone. These sloping to very steep soils are on side slopes and ridgetops on the Cumberland Plateau and Mountains. Slopes range from 20 to 80 percent.

Typical pedon of Petros silt loam in an area of Gilpin-Bouldin-Petros complex, 25 to 75 percent slopes, very stony; in Scott County, Tennessee; on a north-facing mountainside about 1/2 mile southeast of Lone Mountain via a logging road, about 1,600 feet west of a USGS bench mark in Mill Creek and about 0.5 mile southeast of the community of Lone Mountain; lat. 36 degrees 15 minutes 19 seconds N. and long. 84 degrees 29 minutes 03 seconds W.; USGS Norma Quadrangle:

- A—0 to 2 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent shale channers as much as 1/2 inch across; strongly acid; abrupt smooth boundary.
- Bw1—2 to 8 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; 45 percent shale channers as much as 6 inches across; strongly acid; gradual smooth boundary.
- Bw2—8 to 16 inches; yellowish brown (10YR 5/6) extremely channery silt loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; 65 percent shale channers as much as 6 inches across; strongly acid; abrupt smooth boundary.
- Cr—16 to 26 inches; rippable shale.

The thickness of the solum and the depth to rippable bedrock range from 10 to 20 inches. The content of shale channers ranges from 15 to 35 percent in the A horizon and from 35 to 80 percent in the Bw horizon. Reaction is strongly acid or very strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth texture is loam or silt loam.

The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The fine-earth texture is loam or silt loam.

The Bw horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The fine-earth texture is silt loam or silty clay loam.

## Philo Series

The Philo series consists of very deep, moderately well drained soils that formed in coarse textured alluvial sediments. These nearly level soils are on flood plains of streams and rivers that drain the Cumberland Plateau and Mountains. Slopes range from 0 to 3 percent.

Typical pedon of Philo loam in an area of Pope-Philo complex, frequently flooded; in Morgan County, Tennessee; in a field on the flood plain of the Emory River, 1,500 feet south of a bridge over Maden Branch on Gobey Road, about 1 mile northeast of the community of Elizabeth; lat. 36 degrees 09 minutes 36 seconds N. and long. 84 degrees 33 minutes 59 seconds W.; USGS Gobey Quadrangle:

- Ap—0 to 6 inches; dark brown (10YR 4/3) loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
- Bw1—6 to 27 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common fine and medium roots; strongly acid; gradual wavy boundary.
- Bw2—27 to 36 inches; dark yellowish brown (10YR 4/4) loam; weak medium



subangular blocky structure; friable; few fine and medium roots; few fine distinct light brownish gray (10YR 6/2) iron depletions and few medium distinct strong brown (7.5YR 5/6) iron accumulations in the matrix; 5 percent rounded and subrounded gravel as much as 3 inches across; very strongly acid; gradual wavy boundary.

C—36 to 48 inches; yellowish brown (10YR 5/4) fine sandy loam; very friable; common medium distinct light brownish gray (10YR 6/2) iron depletions and few medium distinct strong brown (7.5YR 5/6) iron accumulations in the matrix; 10 percent rounded and subrounded gravel as much as 3 inches across; very strongly acid; clear smooth boundary.

Cg—48 to 60 inches; gray (10YR 5/1) gravelly sandy loam; very friable; common medium prominent yellowish red (5YR 5/6) iron accumulations in the matrix (the gray area is iron depleted); 30 percent rounded and subrounded gravel as much as 3 inches across; very strongly acid.

The thickness of the solum ranges from 30 to 48 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 20 percent above a depth of 40 inches and from 0 to 75 percent below a depth of 40 inches. Reaction typically is strongly acid or very strongly acid throughout the profile. The surface layer is less acid in limed areas.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Texture is loam or silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture is loam, fine sandy loam, or silt loam. Redoximorphic features in shades of brown, gray, and red are common in most pedons.

The C horizon has hue of 10YR, value of 4 or 6, and chroma of 2 to 4. Texture is sandy loam or fine sandy loam.

## Pope Series

The Pope series consists of very deep, well drained soils that formed in coarse textured alluvial sediments. These nearly level soils are on flood plains of streams and rivers that drain the Cumberland Plateau and Mountains. Slopes range from 0 to 3 percent.

Typical pedon of Pope loam in an area of Pope-Philo complex, frequently flooded; in Morgan County, Tennessee; in a field on the flood plain of the Emory River, 1,000 feet south of a bridge over Maden Branch on Gobey Road, about a mile northeast of the community of Elizabeth; lat. 36 degrees 09 minutes 36 seconds N. and long. 84 degrees 33 minutes 59 seconds W.; USGS Gobey Quadrangle:

Ap—0 to 5 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

Bw1—5 to 8 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

Bw2—8 to 25 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; very friable; common fine and medium roots; very strongly acid; gradual wavy boundary.

Bw3—25 to 43 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 5 percent rounded and subrounded gravel as much as 3 inches across; very strongly acid; gradual wavy boundary.

C—43 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; few medium distinct strong brown (7.5YR 5/6) and common medium distinct dark yellowish

brown (10YR 4/6) soft iron masses in the matrix; massive; very friable; 40 percent rounded and subrounded gravel as much as 3 inches across; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 30 percent above a depth of 40 inches and from 0 to 75 percent below a depth of 40 inches. Reaction typically is strongly acid or very strongly acid throughout the profile. The surface layer is less acid in limed areas.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Texture is loam or silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture is loam, fine sandy loam, or silt loam.

The C horizon has hue of 10YR, value of 4 or 6, and chroma of 2 to 4. Texture is sandy loam or fine sandy loam.

## Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained soils that formed in residuum weathered from acid sandstone. These sloping to steep soils are on rolling hillslopes and upper side slopes on the Cumberland Plateau and Mountains. Slopes range from 5 to 35 percent.

Typical pedon of Ramsey loam in an area of Lily-Ramsey complex, 5 to 12 percent slopes; in Scott County, Tennessee; on a ridgetop in Scott State Forest, 1,000 feet northwest of the intersection of Bandy Creek Road and Tennessee Highway 297 (Leatherwood Road), about a mile by road northwest of the Leatherwood Ford on the South Fork of the Cumberland River; lat. 36 degrees 28 minutes 45 seconds N. and long. 84 degrees 40 minutes 54 seconds W.; USGS Honey Creek Quadrangle:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; many fine and medium roots; 3 percent sandstone fragments as much as 2 inches across; strongly acid; clear smooth boundary.

BA—2 to 4 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 3 percent sandstone fragments as much as 2 inches across; strongly acid; clear smooth boundary.

Bw1—4 to 10 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 5 percent sandstone fragments as much as 3 inches across; strongly acid; gradual smooth boundary.

Bw2—10 to 16 inches; yellowish brown (10YR 5/6) channery sandy loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 15 percent sandstone fragments as much as 3 inches across; strongly acid; abrupt smooth boundary.

R—16 inches; sandstone bedrock.

The thickness of the solum and the depth to hard sandstone bedrock range from 10 to 20 inches. The content of sandstone fragments ranges from 0 to 35 percent throughout the profile. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Texture is loam or fine sandy loam.

The Bw horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The fine-earth texture is loam, fine sandy loam, or sandy loam.

The C horizon, if it occurs, has hue of 10YR and value and chroma of 4 to 6. The fine-earth texture is loam, sandy loam, or loamy sand.

## Sequoia Series

The Sequoia series consists of moderately deep, well drained soils that formed in residuum weathered from acid shale. These gently sloping to moderately steep soils are on side slopes and ridgetops on the Cumberland Plateau and Mountains. Slopes range from 2 to 20 percent.

Typical pedon of Sequoia silt loam, 12 to 20 percent slopes; in Scott County, Tennessee; on a ridgetop in a cut along Owens Road, 900 feet southwest of the intersection of Anderson Hollow Road and Owens Road, about 0.7 mile east of the community of Jeffers; lat. 36 degrees 22 minutes 24 seconds N. and long. 84 degrees 22 minutes 44 seconds W.; USGS Norma Quadrangle:

A—0 to 2 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

BE—2 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; many fine, medium, and few coarse roots; strongly acid; clear smooth boundary.

Bt1—5 to 9 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium

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Branch, about 2.4 miles south of the community of Hembree; lat. 36 degrees 12 minutes 08 seconds N. and long. 84 degrees 25 minutes 04 seconds W.; USGS Fork Mountain Quadrangle:

- A—0 to 3 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary.
- BE—3 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.
- Bt1—10 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 10 percent shale and sandstone channers as much as 2 inches across; strongly acid; gradual smooth boundary.
- Bt2—21 to 50 inches; yellowish brown (10YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 15 percent shale and sandstone channers as much as 2 inches across; strongly acid; gradual smooth boundary.
- Bt3—50 to 65 inches; yellowish brown (10YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 30 percent shale channers as much as 3 inches across; strongly acid; gradual smooth boundary.
- Cr—65 to 75 inches; rippable shale.

The thickness of the solum and the depth to rippable or hard bedrock are more than 60 inches. The content of shale and sandstone fragments ranges to 35 percent in the A and B horizons and is as much as 70 percent in the C horizon. Reaction typically is strongly acid or very strongly acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is silt loam or loam.

The BE and Bt horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is silt loam or silty clay loam.

The BC horizon, if it occurs, has colors and textures similar to those of the Bt horizon.

## Wernock Series

The Wernock series consists of moderately deep, well drained soils that formed in residuum weathered from shale, siltstone, and sandstone. These gently sloping and sloping soils are on ridge crests and broad upland interfluvies on the Cumberland Plateau. Slopes range from 2 to 12 percent.

Typical pedon of Wernock silt loam, 2 to 5 percent slopes; in Scott County, Tennessee; on a ridgetop east of the head of Black Wolfe Creek, 100 feet south of Ridge Road and 2.3 miles northwest of the intersection of Indian Fork Creek Road and Rainbow Mine Road, about 2.3 miles (airline) west of the community of Hughett; lat. 36 degrees 18 minutes 52 seconds N. and long. 84 degrees 32 minutes 59 seconds W.; USGS Robbins Quadrangle:

- A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and few medium roots; very strongly acid; abrupt smooth boundary.
- BE—2 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; very friable; many common fine and medium and few coarse roots; very strongly acid; gradual smooth boundary.
- Bt1—12 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium

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subangular blocky structure; friable; common fine and medium and few coarse roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—19 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine, medium, and coarse roots; common faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—27 to 35 inches; brownish yellow (10YR 6/6) silty clay loam; common fine and medium distinct yellowish red (5YR 5/6) lithochromic mottles; weak medium subangular blocky structure; friable; few fine, medium, and coarse roots; 10 percent shale channers as much as 1 inch across; extremely acid; abrupt wavy boundary.

Cr—35 to 45 inches; rippable shale.

The thickness of the solum and the depth to rippable bedrock range from 20 to 40 inches. The content of shale channers ranges from 0 to 10 percent in the A and B horizons and from 5 to 15 percent in the BC horizon. Reaction typically ranges from strongly acid to extremely acid throughout the profile. The surface layer is less acid in limed areas.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is silt loam.

The BE horizon has colors and textures similar to those of the Bt horizon.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. Texture is silty clay loam.

The BC horizon has colors and textures similar to those of the lower part of the Bt horizon.

The C horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. Lithochromic mottles in shades of red and brown occur in some pedons. Texture is silt loam or silty clay loam.

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# Glossary

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**ABC soil.** A soil having an A, a B, and a C horizon.

**AC soil.** A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvial fan.** The fan-like deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Alpha,alpha-dipyridyl.** A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

**Animal unit month (AUM).** The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

**Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.

**Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.

**Aspect.** The direction in which a slope faces.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low .....	0 to 3
Low .....	3 to 6
Moderate .....	6 to 9
High .....	9 to 12
Very high .....	more than 12

**Backslope.** The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

**Basal area.** The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

**Base slope.** A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

**Bedding planes.** Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

**Bedding system.** A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bedrock-controlled topography.** A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

**Bench terrace.** A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

**Bisequum.** Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Breaks.** The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

**Breast height.** An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

**Brush management.** Use of mechanical, chemical, or biological methods to make

fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

**Chemical treatment.** Control of unwanted vegetation through the use of chemicals.

**Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay depletions.** Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

**Coarse textured soil.** Sand or loamy sand.

**Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

**Cobbly soil material.** Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

**COLE (coefficient of linear extensibility).** See Linear extensibility.

**Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

**Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

**Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

**Concretions.** Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

**Conglomerate.** A coarse-grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

**Conservation cropping system.** Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

**Conservation tillage.** A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

**Consistence, soil.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of

puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

**Contour stripcropping.** Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Cropping system.** Growing crops according to a planned system of rotation and management practices.

**Crop residue management.** Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

**Cross-slope farming.** Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

**Crown.** The upper part of a tree or shrub, including the living branches and their foliage.

**Culmination of the mean annual increment (CMAI).** The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

**Deferred grazing.** Postponing grazing or resting grazing land for a prescribed period.

**Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep soils, 20 to 40 inches; shallow soils, 10 to 20 inches; and very shallow soils, less than 10 inches.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Divided-slope farming.** A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

**Drainage class (natural).** Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained*, *somewhat excessively drained*, *well drained*, *moderately well drained*, *somewhat poorly drained*, *poorly drained*, and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Duff.** A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.



- Ecological site.** An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.
- Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.
- Endosaturation.** A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.
- Ephemeral stream.** A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.
- Episaturation.** A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.
- Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.  
*Erosion (geologic).* Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.  
*Erosion (accelerated).* Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.
- Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.
- Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.
- Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
- Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.
- Fill slope.** A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.
- Fine textured soil.** Sandy clay, silty clay, or clay.
- Firebreak.** An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.
- First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.
- Flaggy soil material.** Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.
- Flagstone.** A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

- Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.
- Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.
- Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.
- Footslope.** The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).
- Forb.** Any herbaceous plant not a grass or a sedge.
- Forest cover.** All trees and other woody plants (underbrush) covering the ground in a forest.
- Forest type.** A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.
- Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.
- Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
- Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.
- Graded stripcropping.** Growing crops in strips that grade toward a protected waterway.
- Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
- Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
- Green manure crop (agronomy).** A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
- Ground water.** Water filling all the unblocked pores of the material below the water table.
- Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
- Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.
- Head slope.** A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.
- High-residue crops.** Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

**Hill.** A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr horizon.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff potential.

The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

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Less than 0.2 .....	very low
0.2 to 0.4 .....	low
0.4 to 0.75 .....	moderately low
0.75 to 1.25 .....	moderate
1.25 to 1.75 .....	moderately high
1.75 to 2.5 .....	high
More than 2.5 .....	very high

**Interfluve.** An elevated area between two drainageways that sheds water to those drainageways.

**Intermittent stream.** A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

**Iron depletions.** Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

**Irrigation.** Application of water to soils to assist in production of crops. Methods of irrigation are:

*Basin.*—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

*Border.*—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

*Controlled flooding.*—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

*Corrugation.*—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

*Drip (or trickle).*—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

*Furrow.*—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

*Sprinkler.*—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

*Subirrigation.*—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

*Wild flooding.*—Water, released at high points, is allowed to flow onto an area without controlled distribution.

**Knoll.** A small, low, rounded hill rising above adjacent landforms.

**K<sub>sat</sub>.** Saturated hydraulic conductivity. (See Permeability.)

**Landslide.** The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Linear extensibility.** Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at  $\frac{1}{3}$ - or  $\frac{1}{10}$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Low-residue crops.** Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

**Low strength.** The soil is not strong enough to support loads.

**Masses.** Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

**Mechanical treatment.** Use of mechanical equipment for seeding, brush management, and other management practices.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.

**Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.

**Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

**Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

**Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

**Nodules.** Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

**Nose slope.** A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients



are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low .....	less than 0.5 percent
Low .....	0.5 to 1.0 percent
Moderately low .....	1.0 to 2.0 percent
Moderate .....	2.0 to 4.0 percent
High .....	4.0 to 8.0 percent
Very high .....	more than 8.0 percent

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Pedisediment.** A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher-lying areas of the erosion surface.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The movement of water through the soil.

**Permeability.** The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow .....	0.0 to 0.01 inch
Very slow .....	0.01 to 0.06 inch
Slow .....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid .....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plowpan.** A compacted layer formed in the soil directly below the plowed layer.

**Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse-grained soil or soil material consisting mainly of

particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Potential native plant community.** See Climax plant community.

**Potential rooting depth (effective rooting depth).** Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Prescribed burning.** Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Proper grazing use.** Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid .....	less than 3.5
Extremely acid .....	3.5 to 4.4
Very strongly acid .....	4.5 to 5.0
Strongly acid .....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid .....	6.1 to 6.5
Neutral .....	6.6 to 7.3
Slightly alkaline .....	7.4 to 7.8
Moderately alkaline .....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

**Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

**Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

**Reduced matrix.** A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

- Rill.** A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.
- Road cut.** A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.
- Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
- Root zone.** The part of the soil that can be penetrated by plant roots.
- Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
- Sand.** As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
- Sandstone.** Sedimentary rock containing dominantly sand-sized particles.
- Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
- Scarification.** The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.
- Second bottom.** The first terrace above the normal flood plain (or first bottom) of a river.
- Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
- Sequum.** A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)
- Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
- Shale.** Sedimentary rock formed by the hardening of a clay deposit.
- Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.
- Shoulder.** The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.
- Side slope.** A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.
- Silica.** A combination of silicon and oxygen. The mineral form is called quartz.
- Silica-sesquioxide ratio.** The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.
- Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.
- Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.



**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level .....	0 to 2 percent
Nearly level .....	0 to 3 percent
Gently sloping .....	3 to 5 percent
Moderately sloping .....	5 to 12 percent
Strongly sloping .....	12 to 20 percent
Moderately steep .....	20 to 35 percent
Steep .....	35 to 50 percent
Very steep .....	50 percent and higher

**Soft bedrock.** Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand .....	2.0 to 1.0
Coarse sand .....	1.0 to 0.5
Medium sand .....	0.5 to 0.25
Fine sand .....	0.25 to 0.10
Very fine sand .....	0.10 to 0.05
Silt .....	0.05 to 0.002
Clay .....	less than 0.002

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

**Stone line.** A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Stripcropping.** Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either

*single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

**Summit.** The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

**Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

**Terrace** (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Toeslope.** The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

**Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Variegation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

**Water bars.** Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

**Well graded.** Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

**Wilting point (or permanent wilting point).** The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

**Windthrow.** The uprooting and tipping over of trees by the wind.



# Tables

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# Soil Survey of Morgan County, Tennessee

Table 1.--Temperature and Precipitation  
(Recorded in the period 1961-90 at Oneida, Tennessee)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snow- fall
				Maximum temp. higher than--	Minimum temp. lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January--	42.8	19.5	31.1	68	-15	48	4.34	2.79	5.74	9	5.0
February--	47.4	22.5	35.0	73	-6	72	4.11	2.36	5.66	8	3.6
March----	58.2	31.3	44.8	80	7	209	5.55	3.34	7.53	10	0.4
April----	68.4	39.4	53.9	87	21	415	4.69	2.91	6.30	9	0.1
May-----	75.3	47.6	61.4	88	29	648	5.16	3.23	6.91	9	0.0
June-----	82.0	56.5	69.2	92	39	851	4.41	2.41	6.17	8	0.0
July-----	85.1	60.9	73.0	95	48	1,009	5.38	2.83	7.62	9	0.0
August---	84.2	59.7	71.9	94	46	974	4.20	2.15	5.99	7	0.0
September	78.8	53.3	66.0	91	34	765	3.84	2.20	5.31	7	0.0
October--	69.4	40.5	55.0	86	21	459	4.09	2.00	5.90	6	0.0
November--	58.4	32.4	45.4	79	11	209	4.47	2.91	5.89	9	0.5
December--	47.8	24.5	36.1	79	-3	85	4.40	2.33	6.23	8	1.5
Yearly: Average	66.5	40.7	53.6	---	---	---	---	---	---	---	---
Extreme	102	-26	---	96	-16	---	---	---	---	---	---
Total--	---	---	---	---	---	5,745	54.65	47.68	60.74	99	11.1

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

# Soil Survey of Morgan County, Tennessee

Table 2.—Freeze Dates in Spring and Fall  
(Recorded in the period 1961-90 at Oneida, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 20	May 5	May 18
2 years in 10 later than--	Apr. 14	Apr. 29	May 12
5 years in 10 later than--	Apr. 3	Apr. 16	May 1
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 8	Sept. 27
2 years in 10 earlier than--	Oct. 23	Oct. 13	Oct. 2
5 years in 10 earlier than--	Nov. 4	Oct. 22	Oct. 11

Table 3.—Growing Season  
(Recorded in the period 1961-90 at Oneida, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	189	168	139
8 years in 10	197	175	147
5 years in 10	214	188	163
2 years in 10	231	202	179
1 year in 10	240	209	187

# Soil Survey of Morgan County, Tennessee

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
Ac	Allegheny-Cotaco complex, occasionally flooded-----	9,119	2.7
At	Atkins silt loam, frequently flooded-----	252	0.1
Bm	Bethesda-Mines pit complex, 10 to 80 percent slopes-----	6,626	2.0
GnC	Gilpin silt loam, 5 to 12 percent slopes-----	7,799	2.3
GnD	Gilpin silt loam, 12 to 20 percent slopes-----	23,898	3.1
GpE	Gilpin-Petros complex, 20 to 35 percent slopes-----	49,596	14.8
GpF	Gilpin-Petros complex, 35 to 80 percent slopes-----	30,010	9.0
GsF	Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony-----	64,475	19.3
HeB	Hendon silt loam, 2 to 5 percent slopes-----	837	0.3
HeC	Hendon silt loam, 5 to 12 percent slopes-----	942	0.3
JnF	Jefferson cobbly loam, 20 to 50 percent slopes, stony-----	81	*
LbB	Lily loam, 2 to 5 percent slopes-----	3,807	1.1
LbC	Lily loam, 5 to 12 percent slopes-----	13,886	4.2
LbD	Lily loam, 12 to 20 percent slopes-----	6,977	2.1
LgC	Lily-Gilpin complex, 5 to 12 percent slopes-----	14,689	4.4
LgD	Lily-Gilpin complex, 12 to 20 percent slopes-----	18,521	5.5
LgE	Lily-Gilpin complex, 20 to 35 percent slopes-----	8,170	2.4
LmC	Lily-Ramsey complex, 5 to 12 percent slopes-----	2,848	0.9
LmD	Lily-Ramsey complex, 12 to 20 percent slopes-----	11,874	3.6
LmE	Lily-Ramsey complex, 20 to 35 percent slopes-----	10,279	3.1
LoB	Lonewood silt loam, 2 to 5 percent slopes-----	2,303	0.7
LoC	Lonewood silt loam, 5 to 12 percent slopes-----	5,572	1.7
Pp	Pope-Philo complex, frequently flooded-----	3,122	0.9
RaC	Ramsey-Rock outcrop complex, 5 to 12 percent slopes-----	20	*
RaD	Ramsey-Rock outcrop complex, 12 to 20 percent slopes-----	26	*
RaF	Ramsey-Rock outcrop complex, 20 to 50 percent slopes-----	38	*
SeC	Sequoia silt loam, 5 to 12 percent slopes-----	475	0.1
SeD	Sequoia silt loam, 12 to 20 percent slopes-----	826	0.2
ShC	Shelocta silt loam, 5 to 12 percent slopes-----	1,540	0.5
ShD	Shelocta silt loam, 12 to 20 percent slopes-----	2,273	0.7
ShE	Shelocta silt loam, 20 to 35 percent slopes-----	1,338	0.4
W	Water-----	1,111	0.3
WrB	Wernock silt loam, 2 to 5 percent slopes-----	10,424	3.1
WrC	Wernock silt loam, 5 to 12 percent slopes-----	20,646	6.2
	Total-----	334,400	100.0

\* Less than 0.1 percent.





# Soil Survey of Morgan County, Tennessee

Table 5.—Land Capability Class and Yields per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Tobacco
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Lbs</u>
LmD----- Lily-Ramsey	6e	60.00	2.50	4.50	25.00	1,500.00
Lme----- Lily-Ramsey	6e	---	---	3.60	---	---
LoB----- Lonewood	2e	110.00	4.00	7.20	38.00	2,600.00
LoC----- Lonewood	3e	90.00	3.50	6.30	35.00	2,400.00
Pp----- Pope-Philo	2w	110.00	3.50	6.30	35.00	2,200.00
RaC----- Ramsey-Rock outcrop	6e	---	---	3.50	---	---
RaD----- Ramsey-Rock outcrop	6e	---	---	2.80	---	---
RaF----- Ramsey-Rock outcrop	7e	---	---	---	---	---
SeC----- Sequoia	4e	55.00	2.50	4.50	30.00	1,650.00
SeD----- Sequoia	6e	50.00	2.00	3.60	25.00	1,550.00
ShC----- Shelocta	3e	100.00	3.50	6.30	30.00	2,300.00
ShD----- Shelocta	4e	80.00	3.00	5.40	25.00	2,000.00
ShE----- Shelocta	6e	---	---	4.50	---	---
W. Water						
WrB----- Wernock	2e	110.00	4.00	7.20	35.00	2,800.00
WrC----- Wernock	3e	90.00	3.50	6.30	30.00	2,600.00

# Soil Survey of Morgan County, Tennessee

Table 6.--Acreage by Capability Class and Subclass

Capability class	Capability subclass	Acreage
Unclassified	---	1,124
2	e	15,328
2	w	11,173
3	e	58,281
3	w	227
4	e	47,507
6	e	67,775
7	e	15,647
7	s	85,036

Table 7.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Map unit name
Ac	Allegheny-Cotaco complex, occasionally flooded
At	Atkins silt loam, frequently flooded
HeB	Hendon silt loam, 2 to 5 percent slopes
LbB	Lily loam, 2 to 5 percent slopes
LoB	Lonewood silt loam, 2 to 5 percent slopes
Pp	Pope-Philo complex, frequently flooded (if protected from flooding or not frequently flooded during the growing season)
WrB	Wernock silt loam, 2 to 5 percent slopes

# Soil Survey of Morgan County, Tennessee

Table 8.--Forestland Productivity

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
Ac:				
Allegheny-----	black oak-----	78	57	black oak,
	shortleaf pine-----	95	129	shortleaf pine,
	Virginia pine-----	72	114	Virginia pine,
	white oak-----	70	52	white oak, yellow-
	yellow-poplar-----	93	95	poplar
Cotaco-----	black oak-----	87	62	black oak,
	sweetgum-----	86	90	sweetgum, Virginia
	Virginia pine-----	81	129	pine, white oak,
	white oak-----	80	57	yellow-poplar
	yellow-poplar-----	95	100	
At:				
Atkins-----	eastern cottonwood--	89	95	eastern cottonwood,
	pin oak-----	100	90	pin oak, sweetgum,
	sweetgum-----	90	81	yellow-poplar
	yellow-poplar-----	90	90	
Bm:				
Bethesda-----	eastern redcedar----	45	52	eastern redcedar,
	Virginia pine-----	60	70	Virginia pine
Mines pit-----	eastern redcedar----	45	52	---
	Virginia pine-----	60	70	
GnC:				
Gilpin-----	northern red oak----	80	57	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar
GnD:				
Gilpin-----	northern red oak----	80	57	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar
GpE:				
Gilpin-----	northern red oak----	80	57	black oak, northern
	yellow-poplar-----	90	100	red oak, white
				oak, yellow-poplar
Petros-----	black oak-----	60	43	black oak, chestnut
	chestnut oak-----	55	38	oak, shortleaf
	Virginia pine-----	60	86	pine, Virginia
				pine
GpF:				
Gilpin-----	northern red oak----	80	71	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar
Petros-----	black oak-----	60	43	black oak, chestnut
	chestnut oak-----	---	---	oak, shortleaf
	Virginia pine-----	60	86	pine, Virginia
				pine
GsF:				
Gilpin-----	black oak-----	60	43	black oak, northern
	northern red oak----	80	57	red oak, white
	white oak-----	75	57	oak, yellow-poplar
	yellow-poplar-----	90	100	

# Soil Survey of Morgan County, Tennessee

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
<b>GsF:</b>				
Bouldin-----	northern red oak----	75	57	northern red oak,
	shortleaf pine-----	55	90	shortleaf pine,
	Virginia pine-----	60	81	Virginia pine,
	white oak-----	50	38	white oak, yellow-
	yellow-poplar-----	90	86	poplar
Petros-----	black oak-----	60	43	black oak, chestnut
	chestnut oak-----	55	38	oak, shortleaf
	shortleaf pine-----	55	90	pine, southern red
	southern red oak----	60	43	oak, Virginia pine
	Virginia pine-----	60	86	
<b>HeB:</b>				
Hendon-----	loblolly pine-----	80	114	eastern white pine,
	shortleaf pine-----	70	114	loblolly pine,
	southern red oak----	70	57	shortleaf pine,
	Virginia pine-----	70	114	Virginia pine
	white oak-----	70	57	
<b>HeC:</b>				
Hendon-----	loblolly pine-----	80	114	eastern white pine,
	shortleaf pine-----	70	114	loblolly pine,
	southern red oak----	70	57	shortleaf pine,
	Virginia pine-----	70	114	Virginia pine
	white oak-----	70	57	
<b>JnF:</b>				
Jefferson-----	northern red oak----	80	57	eastern white pine,
	shortleaf pine-----	70	114	shortleaf pine,
	white oak-----	70	57	white oak, yellow-
	yellow-poplar-----	90	100	poplar
<b>LbB:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
<b>LbC:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
<b>LbD:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
<b>LgC:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Gilpin-----	northern red oak----	80	57	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar

# Soil Survey of Morgan County, Tennessee

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
<b>LgD:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Gilpin-----	northern red oak----	80	57	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar
<b>LgE:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Gilpin-----	northern red oak----	80	57	northern red oak,
	yellow-poplar-----	90	100	yellow-poplar
<b>LmC:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
<b>LmD:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
<b>LmE:</b>				
Lily-----	scarlet oak-----	77	43	scarlet oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	80	114	Virginia pine,
	white oak-----	73	57	white oak
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
<b>LoB:</b>				
Lonewood-----	northern red oak----	70	62	northern red oak,
	shortleaf pine-----	70	114	shortleaf pine,
	Virginia pine-----	70	114	Virginia pine,
	white oak-----	70	57	white oak, yellow-
	yellow-poplar-----	90	90	poplar

# Soil Survey of Morgan County, Tennessee

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
LoC:				
Lonewood-----	northern red oak----	70	62	northern red oak,
	shortleaf pine-----	70	114	shortleaf pine,
	Virginia pine-----	70	114	Virginia pine,
	white oak-----	70	57	white oak, yellow-
	yellow-poplar-----	90	95	poplar
Pp:				
Pope-----	American sycamore---	75	81	American sycamore,
	northern red oak----	80	62	northern red oak,
	sweetgum-----	75	86	sweetgum, white
	white oak-----	80	57	oak, yellow-poplar
	yellow-poplar-----	96	100	
Philo-----	American sycamore---	75	81	American sycamore,
	northern red oak----	80	62	northern red oak,
	sweetgum-----	75	86	sweetgum, white
	white oak-----	80	57	oak, yellow-poplar
	yellow-poplar-----	96	100	
RaC:				
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
Rock outcrop.				
RaD:				
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
Rock outcrop.				
RaF:				
Ramsey-----	northern red oak----	50	29	northern red oak,
	shortleaf pine-----	50	72	shortleaf pine,
	Virginia pine-----	50	77	Virginia pine
Rock outcrop.				
SeC:				
Sequoia-----	northern red oak----	70	57	northern red oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	71	114	Virginia pine
SeD:				
Sequoia-----	northern red oak----	70	57	northern red oak,
	shortleaf pine-----	63	100	shortleaf pine,
	Virginia pine-----	71	114	Virginia pine
ShC:				
Shelocta-----	black oak-----	80	107	black oak, scarlet
	scarlet oak-----	80	43	oak, white oak,
	white oak-----	70	57	yellow-poplar
	yellow-poplar-----	100	57	

# Soil Survey of Morgan County, Tennessee

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
ShD: Shelocta-----	black oak-----	80	107	black oak, scarlet oak, white oak, yellow-poplar
	scarlet oak-----	80	43	
	white oak-----	70	57	
	yellow-poplar-----	100	57	
ShE: Shelocta-----	black oak-----	80	107	black oak, scarlet oak, white oak, yellow-poplar
	scarlet oak-----	80	43	
	white oak-----	70	57	
	yellow-poplar-----	100	57	
W. Water				
WrB: Wernock-----	black oak-----	71	57	black oak, chestnut oak, scarlet oak, shortleaf pine, white oak
	chestnut oak-----	71	57	
	scarlet oak-----	73	57	
	shortleaf pine-----	70	114	
	white oak-----	71	57	
WrC: Wernock-----	black oak-----	71	57	black oak, chestnut oak, scarlet oak, shortleaf pine, white oak
	chestnut oak-----	71	57	
	scarlet oak-----	73	57	
	shortleaf pine-----	70	114	
	white oak-----	71	57	



# Soil Survey of Morgan County, Tennessee

Table 9.--Forestland Management, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Moderate Flooding Low strength	0.50 0.50	Moderately suited Flooding Low strength	0.50 0.50	Severe Low strength	1.00
Cotaco-----	35	Moderate Flooding Low strength	0.50 0.50	Moderately suited Flooding Low strength	0.50 0.50	Severe Low strength	1.00
At: Atkins-----	90	Severe Flooding Low strength	1.00 0.50	Poorly suited Flooding Wetness Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Bm: Bethesda-----	75	Severe Landslides Slope Low strength	1.00 1.00 0.50	Poorly suited Landslides Slope Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Moderate Low strength	0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
GnD: Gilpin-----	90	Moderate Slope Low strength	0.50 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
GpE: Gilpin-----	55	Severe Landslides Slope Low strength	1.00 0.50 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Petros-----	35	Severe Landslides Slope	1.00 0.50	Poorly suited Slope Landslides	1.00 1.00	Severe Low strength	1.00
GpF: Gilpin-----	65	Severe Slope Landslides Low strength	1.00 1.00 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Petros-----	25	Severe Slope Landslides	1.00 1.00	Poorly suited Slope Landslides	1.00 1.00	Severe Low strength	1.00

# Soil Survey of Morgan County, Tennessee

Table 9.--Forestland Management, Part I--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Gilpin-----	35	Severe Landslides Slope Low strength	1.00 1.00 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Bouldin-----	30	Severe Landslides Slope Stoniness	1.00 1.00 0.50	Poorly suited Slope Landslides Rock fragments	1.00 1.00 1.00	Slight Strength	0.10
Petros-----	25	Severe Landslides Slope	1.00 1.00	Poorly suited Slope Landslides	1.00 1.00	Severe Low strength	1.00
HeB: Hendon-----	90	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
HeC: Hendon-----	85	Moderate Low strength	0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
JnF: Jefferson-----	90	Severe Slope Low strength	1.00 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
LbB: Lily-----	86	Moderate Low strength Restrictive layer	0.50 0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
LbC: Lily-----	85	Moderate Low strength Restrictive layer	0.50 0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
LbD: Lily-----	85	Moderate Restrictive layer Slope Low strength	0.50 0.50 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
LgC: Lily-----	65	Moderate Low strength Restrictive layer	0.50 0.50	Moderately suited Low strength Slope	0.50	Severe Low strength	1.00
Lily-----	85	Low strength Restrictive layer Rest	0.50 0.50 0.50	Low strength e	0.50	Severe Low strength	1.00
Lily-----	85	60derate Restrictive layer Slope Reststrength	0.50 0.50 0.50	Modely suited Slope Low strength	1.00 0.50	Severe Low strength	1.00

# Soil Survey of Morgan County, Tennessee

Table 9.--Forestland Management, Part I--Continued

Map symbol and soil name	Pct. of map	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgD: Gilpin-----	35	Moderate Slope Low strength	0.50 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
LgE: Lily-----	55	Severe Landslides Slope Restrictive layer Low strength	1.00 0.50 0.50 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Gilpin-----	35	Severe Landslides Slope Low strength	1.00 0.50 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
LmC: Lily-----	60	Moderate Low strength Restrictive layer	0.50 0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
Ramsey-----	30	Severe Restrictive layer	1.00	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
LmD: Lily-----	55	Moderate Restrictive layer Slope Low strength	0.50 0.50 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
Ramsey-----	40	Severe Restrictive layer Slope	1.00 0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
LmE: Lily-----	55	Severe Landslides Slope Restrictive layer Low strength	1.00 0.50 0.50 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Ramsey-----	40	Severe Landslides Restrictive layer Slope	1.00 1.00 0.50	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50	Severe Low strength	1.00
LoB: Lonewood-----	85	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
LoC: Lonewood-----	85	Moderate Low strength	0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00

# Soil Survey of Morgan County, Tennessee

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part I—Continued

Map symbol and soil name	Pct. of map	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
	unit	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
WrC: Wernock-----	90	Moderate Low strength	0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac:							
Allegheny-----	55	Slight		Slight		Moderately suited Flooding	0.50
						Low strength	0.50
Cotaco-----	35	Slight		Slight		Moderately suited Flooding	0.50
						Low strength	0.50
At:							
Atkins-----	90	Slight		Slight		Poorly suited Flooding	1.00
						Wetness	1.00
						Low strength	0.50
Bm:							
Bethesda-----	75	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Landslides	1.00
						Slope	1.00
						Low strength	0.50
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC:							
Gilpin-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength	0.50
						Slope	0.50
GnD:							
Gilpin-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
						Low strength	0.50
GpE:							
Gilpin-----	55	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
						Landslides	1.00
						Low strength	0.50
Petros-----	35	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
						Landslides	1.00
GpF:							
Gilpin-----	65	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
						Landslides	1.00
						Low strength	0.50
Petros-----	25	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
						Landslides	1.00

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part II—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Gilpin-----	35	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
Bouldin-----	30	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Rock fragments	1.00 1.00 1.00
Petros-----	25	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides	1.00 1.00
HeB: Hendon-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
HeC: Hendon-----	85	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
JnF: Jefferson-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
LbB: Lily-----	85	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
LbC: Lily-----	85	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
LbD: Lily-----	85	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
LgC: Lily-----	65	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
Gilpin-----	30	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
LgD: Lily-----	60	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
Gilpin-----	35	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part II—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgE: Lily-----	55	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
Gilpin-----	35	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
LmC: Lily-----	60	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
Ramsey-----	30	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
LmD: Lily-----	60	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
Ramsey-----	30	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
LmE: Lily-----	55	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
Ramsey-----	40	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
LoB: Lonewood-----	85	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
LoC: Lonewood-----	85	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
Pp: Pope-----	50	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
Philo-----	45	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50



# Soil Survey of Morgan County, Tennessee

Table 9.--Forestland Management, Part II--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RaC: Ramsey-----	80	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD: Ramsey-----	75	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
SeD: Sequoia-----	85	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
ShC: Shelocta-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50
ShD: Shelocta-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
ShE: Shelocta-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Landslides Low strength	1.00 1.00 0.50
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
WrC: Wernock-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Low strength Slope	0.50 0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part III

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac:							
Allegheny-----	55	Well suited		Well suited		Moderately suited Low strength	0.50
Cotaco-----	35	Well suited		Well suited		Moderately suited Low strength	0.50
At:							
Atkins-----	90	Well suited		Well suited		Moderately suited Low strength	0.50
Bm:							
Bethesda-----	75	Moderately suited Slope	0.50	Unsuited Slope Rock fragments	1.00 0.50	Poorly suited Slope Low strength	1.00 0.50
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC:							
Gilpin-----	90	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
GnD:							
Gilpin-----	90	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
GpE:							
Gilpin-----	55	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
Petros-----	35	Moderately suited Rock fragments	0.50	Unsuited Slope Rock fragments	1.00 0.75	Moderately suited Slope	0.50
GpF:							
Gilpin-----	65	Moderately suited Slope	0.50	Unsuited Slope	1.00	Poorly suited Slope Low strength	1.00 0.50
Petros-----	25	Moderately suited Slope Rock fragments	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Poorly suited Slope	1.00
GsF:							
Gilpin-----	35	Moderately suited Slope	0.50	Unsuited Slope Rock fragments	1.00 0.50	Poorly suited Slope Low strength	1.00 0.50
Bouldin-----	30	Moderately suited Slope Rock fragments	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Poorly suited Rock fragments Slope	1.00 1.00

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Petros-----	25	Moderately suited Slope Rock fragments	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Poorly suited Slope	1.00
HeB: Hendon-----	90	Well suited		Well suited		Moderately suited Low strength	0.50
HeC: Hendon-----	85	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
JnF: Jefferson-----	90	Moderately suited Slope Rock fragments	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Moderately suited Slope Low strength	0.50 0.50
LbB: Lily-----	85	Well suited		Well suited		Moderately suited Low strength	0.50
LbC: Lily-----	85	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
LbD: Lily-----	85	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
LgC: Lily-----	65	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
Gilpin-----	30	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
LgD: Lily-----	60	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
Gilpin-----	35	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
LgE: Lily-----	55	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
Gilpin-----	35	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
LmC: Lily-----	60	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
Ramsey-----	30	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LmD:							
Lily-----	55	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
Ramsey-----	40	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
LmE:							
Lily-----	50	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
Ramsey-----	40	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
LoB:							
Lonewood-----	85	Well suited		Well suited		Moderately suited Low strength	0.50
LoC:							
Lonewood-----	85	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
Pp:							
Pope-----	50	Well suited		Well suited		Moderately suited Low strength	0.50
Philo-----	45	Well suited		Well suited		Moderately suited Low strength	0.50
RaC:							
Ramsey-----	80	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD:							
Ramsey-----	75	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength	0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF:							
Ramsey-----	75	Moderately suited Slope	0.50	Unsuited Slope	1.00	Moderately suited Slope Low strength	0.50 0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC:							
Sequoia-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index Slope	0.50 0.50	Moderately suited Low strength	0.50
SeD:							
Sequoia-----	85	Moderately suited Stickiness; high plasticity index	0.50	Poorly suited Slope Stickiness; high plasticity index	0.75 0.50	Moderately suited Low strength	0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ShC: Shelocta-----	90	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
ShD: Shelocta-----	90	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
ShE: Shelocta-----	90	Well suited		Unsuited Slope	1.00	Moderately suited Low strength Slope	0.50 0.50
WrB: Wernock-----	90	Well suited		Well suited		Moderately suited Low strength	0.50
W: Water-----	100	Not rated		Not rated		Not rated	
WrC: Wernock-----	90	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part IV

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ac:					
Allegheny-----	55	Well suited		Well suited	
Cotaco-----	35	Well suited		Well suited	
At:					
Atkins-----	90	Well suited		Well suited	
Bm:					
Bethesda-----	75	Unsuited Slope	1.00	Unsuited Slope	1.00
Mines pit-----	25	Not rated		Not rated	
GnC:					
Gilpin-----	90	Well suited		Well suited	
GnD:					
Gilpin-----	90	Poorly suited Slope	0.50	Poorly suited Slope	0.50
GpE:					
Gilpin-----	55	Poorly suited Slope	0.50	Poorly suited Slope	0.50
Petros-----	35	Poorly suited Slope Rock fragments	0.50 0.50	Poorly suited Slope	0.50
GpF:					
Gilpin-----	65	Unsuited Slope	1.00	Unsuited Slope	1.00
Petros-----	25	Unsuited Slope Rock fragments	1.00 0.50	Unsuited Slope	1.00
GsF:					
Gilpin-----	35	Unsuited Slope	1.00	Unsuited Slope	1.00
Bouldin-----	30	Unsuited Slope Rock fragments	1.00 1.00	Unsuited Slope Rock fragments	1.00 0.50
Petros-----	25	Unsuited Slope Rock fragments	1.00 0.50	Unsuited Slope	1.00
HeB:					
Hendon-----	90	Well suited		Well suited	

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
HeC: Hendon-----	85	Well suited		Well suited	
JnF: Jefferson-----	90	Poorly suited Slope Rock fragments	0.50 0.50	Poorly suited Slope	0.50
LbB: Lily-----	85	Well suited		Poorly suited Restrictive layer	0.50
LbC: Lily-----	85	Well suited		Poorly suited Restrictive layer	0.50
LbD: Lily-----	85	Poorly suited Slope	0.50	Poorly suited Slope Restrictive layer	0.50 0.50
LgC: Lily-----	65	Well suited		Poorly suited Restrictive layer	0.50
Gilpin-----	30	Well suited		Well suited	
LgD: Lily-----	60	Poorly suited Slope	0.50	Poorly suited Slope Restrictive layer	0.50 0.50
Gilpin-----	35	Poorly suited Slope	0.50	Poorly suited Slope	0.50
LgE: Lily-----	55	Poorly suited Slope	0.50	Poorly suited Slope Restrictive layer	0.50 0.50
Gilpin-----	35	Poorly suited Slope	0.50	Poorly suited Slope	0.50
LmC: Lily-----	60	Well suited		Poorly suited Restrictive layer	0.50
Ramsey-----	30	Well suited		Unsuited Restrictive layer	1.00
LmD: Lily-----	55	Poorly suited Slope	0.50	Poorly suited Slope Restrictive layer	0.50 0.50
Ramsey-----	40	Poorly suited Slope	0.50	Unsuited Restrictive layer Slope	1.00 0.50

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>LmE:</b>					
Lily-----	50	Poorly suited Slope	0.50	Poorly suited Slope Restrictive layer	0.50 0.50
Ramsey-----	40	Poorly suited Slope	0.50	Unsuited Restrictive layer Slope	1.00 0.50
<b>LoB:</b>					
Lonewood-----	85	Well suited		Well suited	
<b>LoC:</b>					
Lonewood-----	85	Well suited		Well suited	
<b>Pp:</b>					
Pope-----	50	Well suited		Well suited	
Philo-----	45	Well suited		Well suited	
<b>RaC:</b>					
Ramsey-----	80	Well suited		Unsuited Restrictive layer	1.00
Rock outcrop-----	15	Not rated		Not rated	
<b>RaD:</b>					
Ramsey-----	75	Poorly suited Slope	0.50	Unsuited Restrictive layer Slope	1.00 0.50
Rock outcrop-----	15	Not rated		Not rated	
<b>RaF:</b>					
Ramsey-----	75	Poorly suited Slope	0.50	Unsuited Restrictive layer Slope	1.00 0.50
Rock outcrop-----	15	Not rated		Not rated	
<b>SeC:</b>					
Sequoia-----	90	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
<b>SeD:</b>					
Sequoia-----	85	Poorly suited Slope Stickiness; high plasticity index	0.50 0.50	Poorly suited Slope	0.50
<b>ShC:</b>					
Shelocta-----	90	Well suited		Well suited	
<b>ShD:</b>					
Shelocta-----	90	Poorly suited Slope	0.50	Poorly suited Slope	0.50



# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ShE: Shelocta-----	90	Poorly suited Slope	0.50	Poorly suited Slope	0.50
W: Water-----	100	Not rated		Not rated	
WrB: Wernock-----	90	Well suited		Well suited	
WrC: Wernock-----	90	Well suited		Well suited	

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part V

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	65	Low Texture/coarse fragments	0.10	Low	
Cotaco-----	35	Low Texture/coarse fragments	0.10	Low	
At: Atkins-----	90	Low Texture/coarse fragments	0.10	High Wetness	1.00
Bm: Bethesda-----	75	Moderate Texture/coarse fragments	0.50	Low	
Mines pit-----	25	Not rated		Not rated	
GnC: Gilpin-----	90	Low Texture/coarse fragments	0.10	Low	
GnD: Gilpin-----	90	Low Texture/coarse fragments	0.10	Low	
GpE: Gilpin-----	55	Low Texture/coarse fragments	0.10	Low	
Petros-----	35	Low		Low	
GpF: Gilpin-----	65	Low		Low	
Petros-----	25	High Texture/slope/ surface depth/ coarse fragments	1.00	Low	
GsF: Gilpin-----	35	Low		Low	
Bouldin-----	30	Low Texture/coarse fragments	0.10	Low	

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Petros-----	25	High Texture/slope/ surface depth/ coarse fragments	1.00	Low	
HeB: Hendon-----	90	Low		Low	
HeC: Hendon-----	85	Low		Low	
JnF: Jefferson-----	90	Low		Low	
LbB: Lily-----	85	Low		Low	
LbC: Lily-----	85	Low		Low	
LbD: Lily-----	85	Low		Low	
LgC: Lily-----	65	Low		Low	
Gilpin-----	30	Low Texture/coarse fragments	0.10	Low	
LgD: Lily-----	60	Low		Low	
Gilpin-----	35	Low Texture/coarse fragments	0.10	Low	
LgE: Lily-----	55	Low		Low	
Gilpin-----	35	Low Texture/coarse fragments	0.10	Low	
LmC: Lily-----	60	Low		Low	
Ramsey-----	30	Low		Low	
LmD: Lily-----	55	Low		Low	
Ramsey-----	40	Low		Low	
LmE: Lily-----	50	Low		Low	
Ramsey-----	40	Low		Low	

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LoB: Lonewood-----	85	Low Texture/coarse fragments	0.10	Low	
LoC: Lonewood-----	85	Low Texture/coarse fragments	0.10	Low	
Pp: Pope-----	50	Low Texture/coarse fragments	0.10	Low	
Philo-----	45	Low Texture/coarse fragments	0.10	Low	
RaC: Ramsey-----	80	Low		Low	
Rock outcrop-----	15	Not rated		Not rated	
RaD: Ramsey-----	75	Low		Low	
Rock outcrop-----	15	Not rated		Not rated	
RaF: Ramsey-----	75	High Texture/slope/ surface depth/ coarse fragments	1.00	Low	
Rock outcrop-----	15	Not rated		Not rated	
SeC: Sequoia-----	90	Moderate Texture/coarse fragments	0.50	Low	
SeD: Sequoia-----	85	Moderate Texture/coarse fragments	0.50	Low	
ShC: Shelocta-----	90	Low		Low	
ShD: Shelocta-----	90	Low		Low	
ShE: Shelocta-----	90	Low		Low	
W: Water-----	100	Not rated		Not rated	

# Soil Survey of Morgan County, Tennessee

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
WrB: Wernock-----	90	Low Texture/coarse fragments	0.10	Low	
WrC: Wernock-----	90	Low Texture/coarse fragments	0.10	Low	

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Cotaco-----	35	Very limited Flooding Depth to saturated zone	1.00 0.39	Somewhat limited Depth to saturated zone	0.19	Somewhat limited Flooding Depth to saturated zone Gravel content	0.60 0.39 0.22
At: Atkins-----	90	Very limited Depth to saturated zone Flooding	1.00 1.00	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 1.00
Bm: Bethesda-----	75	Very limited Slope Restricted permeability Gravel content	1.00 0.21 0.08	Very limited Slope Restricted permeability Gravel content	1.00 0.21 0.08	Very limited Slope Gravel content Restricted permeability Content of large stones	1.00 1.00 0.21 0.03
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
GnD: Gilpin-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
GpE: Gilpin-----	55	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
Petros-----	35	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.32	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.32	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 1.00
GpF: Gilpin-----	65	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50

# Soil Survey of Morgan County, Tennessee

Table 10.--Recreational Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpF: Petros-----	25	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.32	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.32	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 1.00
GsF: Gilpin-----	35	Very limited Slope Too stony	1.00 0.19	Very limited Slope Too stony	1.00 0.19	Very limited Slope Depth to bedrock Gravel content Too stony	1.00 0.84 0.50 0.19
Bouldin-----	30	Very limited Slope Too stony Content of large stones	1.00 1.00 0.02	Very limited Slope Too stony Content of large stones	1.00 1.00 0.02	Very limited Slope Too stony Content of large stones Gravel content	1.00 1.00 0.99 0.86
Petros-----	25	Very limited Slope Depth to bedrock Gravel content Too stony	1.00 1.00 0.32 0.19	Very limited Slope Depth to bedrock Gravel content Too stony	1.00 1.00 0.32 0.19	Very limited Slope Depth to bedrock Gravel content Too stony	1.00 1.00 1.00 0.19
HeB: Hendon-----	90	Not limited		Not limited		Somewhat limited Slope	0.50
HeC: Hendon-----	85	Not limited		Not limited		Very limited Slope	1.00
JnF: Jefferson-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Content of large stones Gravel content	1.00 0.84 0.71
LbB: Lily-----	85	Not limited		Not limited		Somewhat limited Slope Depth to bedrock	0.50 0.46
LbC: Lily-----	85	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Depth to bedrock	1.00 0.46
LbD: Lily-----	85	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.46
LgC: Lily-----	65	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Depth to bedrock	1.00 0.46

# Soil Survey of Morgan County, Tennessee

Table 10.--Recreational Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgC: Gilpin-----	35	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
LgD: Lily-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	30	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
LgE: Lily-----	55	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	35	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.84 0.50
LmC: Lily-----	60	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	30	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.22
LmD: Lily-----	55	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.22
LmE: Lily-----	50	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.22
LoB: Lonewood-----	85	Not limited		Not limited		Somewhat limited Slope	0.50



# Soil Survey of Morgan County, Tennessee

Table 10.--Recreational Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LoC: Lonewood-----	85	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
Pp: Pope-----	50	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding Gravel content	1.00 0.06
Philo-----	45	Very limited Flooding Depth to saturated zone	1.00 0.07	Somewhat limited Flooding Depth to saturated zone	0.40 0.03	Very limited Flooding Depth to saturated zone Gravel content	1.00 0.07 0.06
RaC: Ramsey-----	80	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope Gravel content Content of large stones	1.00 1.00 0.16 0.01
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD: Ramsey-----	75	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.22
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.22
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Somewhat limited Restricted permeability Slope	0.26 0.04	Somewhat limited Restricted permeability Slope	0.26 0.04	Very limited Slope Depth to bedrock Restricted permeability	1.00 0.95 0.26
SeD: Sequoia-----	85	Very limited Slope Restricted permeability	1.00 0.26	Very limited Slope Restricted permeability	1.00 0.26	Very limited Slope Depth to bedrock Restricted permeability	1.00 0.95 0.26
ShC: Shelocta-----	90	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope Gravel content	1.00 0.22

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ShD: Shelocta-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Gravel content	1.00 0.22
ShE: Shelocta-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Gravel content	1.00 0.22
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Not limited		Not limited		Somewhat limited Slope Depth to bedrock	0.28 0.10
WrC: Wernock-----	90	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Slope Depth to bedrock	1.00 0.10

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Not limited		Not limited		Somewhat limited Flooding	0.60
Cotaco-----	35	Not limited		Not limited		Somewhat limited Flooding Depth to saturated zone	0.60 0.19
At: Atkins-----	90	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Flooding Depth to saturated zone	1.00 1.00
Bm: Bethesda-----	75	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Gravel content Content of large stones	1.00 0.08 0.03
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Not limited		Not limited		Somewhat limited Depth to bedrock Slope Droughty	0.84 0.04 0.03
GnD: Gilpin-----	90	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
GpE: Gilpin-----	55	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
Petros-----	35	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32
GpF: Gilpin-----	65	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpF: Petros-----	25	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32
GsF: Gilpin-----	35	Very limited Slope Too stony	1.00 0.19	Very limited Slope Too stony	1.00 0.19	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
Bouldin-----	30	Very limited Slope Too stony Content of large stones	1.00 1.00 0.02	Very limited Too stony Slope Content of large stones	1.00 1.00 0.02	Very limited Slope Content of large stones Droughty	1.00 0.99 0.34
Petros-----	25	Very limited Slope Too stony	1.00 0.19	Very limited Slope Too stony	1.00 0.19	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32
HeB: Hendon-----	90	Not limited		Not limited		Not limited	
HeC: Hendon-----	85	Not limited		Not limited		Not limited	
JnF: Jefferson-----	90	Very limited Slope	1.00	Somewhat limited Slope	0.78	Very limited Slope Content of large stones	1.00 0.84
LbB: Lily-----	85	Not limited		Not limited		Somewhat limited Depth to bedrock	0.46
LbC: Lily-----	95	Not limited		Not limited		Somewhat limited Depth to bedrock Slope	0.46 0.04
LbD: Lily-----	85	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock	1.00 0.46
LgC: Lily-----	65	Not limited		Not limited		Somewhat limited Depth to bedrock Slope	0.46 0.04
Gilpin-----	30	Not limited		Not limited		Somewhat limited Depth to bedrock Slope Droughty	0.84 0.04 0.03

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgD:							
Lily-----	60	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	35	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
LgE:							
Lily-----	55	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	35	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
LmC:							
Lily-----	60	Not limited		Not limited		Somewhat limited Depth to bedrock Slope	0.46 0.04
Ramsey-----	30	Not limited		Not limited		Very limited Depth to bedrock Droughty Slope	1.00 1.00 0.04
LmD:							
Lily-----	55	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Somewhat limited Slope	0.02	Not limited		Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00
LmE:							
Lily-----	50	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
LoB:							
Lonewood-----	85	Not limited		Not limited		Not limited	
LoC:							
Lonewood-----	85	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Slope	0.04

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pp: Pope-----	50	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
Philo-----	45	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding Depth to saturated zone	1.00 0.03
RaC: Ramsey-----	80	Not limited		Not limited		Very limited Depth to bedrock Droughty Slope Content of large stones	1.00 1.00 0.04 0.01
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD: Ramsey-----	75	Somewhat limited Slope	0.02	Not limited		Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Very limited Slope	1.00	Somewhat limited Slope	0.78	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Depth to bedrock Droughty Slope	0.95 0.29 0.04
SeD: Sequoia-----	85	Very limited Water erosion Slope	1.00 0.02	Very limited Water erosion	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.95 0.29
ShC: Shelocta-----	90	Not limited		Not limited		Somewhat limited Slope	0.04
ShD: Shelocta-----	90	Not limited		Not limited		Very limited Slope	1.00

# Soil Survey of Morgan County, Tennessee

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ShE: Shelocta-----	90	Very limited Slope	1.00	Somewhat limited Slope	0.08	Very limited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Not limited		Not limited		Somewhat limited Depth to bedrock	0.10
WrC: Wernock-----	90	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Depth to bedrock Slope	0.10 0.01

# Soil Survey of Morgan County, Tennessee

Table 11.--Wildlife Habitat

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
Ac:										
Allegheny-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Cotaco-----	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor
At:										
Atkins-----	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
Bm:										
Bethesda-----	Very poor	Very poor	Poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor
Mines pit.										
GnC:										
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
GnD:										
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
GpE:										
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Petros-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor
GpF:										
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Petros-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor
GsF:										
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Bouldin-----	Very poor	Very poor	Fair	Good	Good	Very poor	Very poor	Poor	Fair	Very poor
Petros-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor
HeB:										
Hendon-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
HeC:										
Hendon-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
JnF:										
Jefferson-----	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor



# Soil Survey of Morgan County, Tennessee

Table 11.—Wildlife Habitat—Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
LbB: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
LbC: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
LbD: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
LgC: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
LgD: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
LgE: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
LmC: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
LmD: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
LmE: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
LoB: Lonewood-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor

# Soil Survey of Morgan County, Tennessee

Table 11.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
LoC: Lonewood-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Pp: Pope-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Philo-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
RaC: Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop.										
RaD: Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop.										
RaF: Ramsey-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop.										
SeC: Sequoia-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
SeD: Sequoia-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
ShC: Shelocta-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
ShD: Shelocta-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
ShE: Shelocta-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
W. Water										
WrB: Wernock-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
WrC: Wernock-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	65	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.03	Very limited Flooding	1.00
Cotaco-----	35	Very limited Flooding Depth to saturated zone	1.00 0.39	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.39
At: Atkins-----	90	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
Bm: Bethesda-----	75	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Somewhat limited Slope	0.04	Somewhat limited Depth to soft bedrock Slope	0.84 0.04	Very limited Slope	1.00
GnD: Gilpin-----	90	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
GpE: Gilpin-----	55	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
Petros-----	35	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00
GpF: Gilpin-----	65	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
Petros-----	25	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Gilpin-----	35	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
Bouldin-----	30	Very limited Slope Content of large stones	1.00 0.35	Very limited Slope Content of large stones	1.00 0.35	Very limited Slope Content of large stones	1.00 0.35
Petros-----	25	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Slope Depth to soft bedrock	1.00 1.00
HeB: Hendon-----	90	Not limited		Not limited		Not limited	
HeC: Hendon-----	85	Not limited		Not limited		Somewhat limited Slope	0.88
JnF: Jefferson-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
LbB: Lily-----	85	Somewhat limited Depth to hard bedrock	0.46	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock	0.46
LbC: Lily-----	85	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Slope Depth to hard bedrock	1.00 0.46
LbD: Lily-----	85	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.46
LgC: Lily-----	65	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Slope Depth to hard bedrock	1.00 0.46
Gilpin-----	30	Somewhat limited Slope	0.04	Somewhat limited Depth to soft bedrock Slope	0.84 0.04	Very limited Slope	1.00
LgD: Lily-----	60	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.46

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgD: Gilpin-----	35	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
LgE: Lily-----	55	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.46
Gilpin-----	35	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.84	Very limited Slope	1.00
LmC: Lily-----	60	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Slope Depth to hard bedrock	1.00 0.46
Ramsey-----	30	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Slope	1.00 1.00
LmD: Lily-----	55	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.46
Ramsey-----	40	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
LmE: Lily-----	50	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.46
Ramsey-----	40	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
LoB: Lonewood-----	85	Not limited		Not limited		Not limited	
LoC: Lonewood-----	85	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pp: Pope-----	50	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.03	Very limited Flooding	1.00
Philo-----	45	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.07
RaC: Ramsey-----	80	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Slope	1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD: Ramsey-----	75	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Somewhat limited Shrink-swell Slope	0.50 0.04	Somewhat limited Depth to soft bedrock Shrink-swell Slope	0.95 0.50 0.04	Very limited Slope Shrink-swell	1.00 0.50
SeD: Sequoia-----	85	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 0.95 0.50	Very limited Slope Shrink-swell	1.00 0.50
ShC: Shelocta-----	90	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
ShD: Shelocta-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
ShE: Shelocta-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Not limited		Somewhat limited Depth to soft bedrock	0.10	Not limited	
WrC: Wernock-----	90	Somewhat limited Slope	0.01	Somewhat limited Depth to soft bedrock Slope	0.10 0.01	Very limited Slope	1.00

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	65	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding Depth to saturated zone	1.00 0.60 0.03	Somewhat limited Flooding	0.60
Cotaco-----	35	Very limited Flooding Depth to saturated zone	1.00 0.19	Very limited Depth to saturated zone Cutbanks cave Flooding	1.00 1.00 0.60	Somewhat limited Flooding Depth to saturated zone	0.60 0.19
At: Atkins-----	90	Very limited Depth to saturated zone Flooding	1.00 1.00	Very limited Depth to saturated zone Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Flooding Depth to saturated zone	1.00 1.00
Bm: Bethesda-----	75	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope Gravel content Content of large stones	1.00 0.08 0.03
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Very limited Low strength Slope	1.00 0.04	Somewhat limited Depth to soft bedrock Cutbanks cave Slope	0.84 0.10 0.04	Somewhat limited Depth to bedrock Slope Droughty	0.84 0.04 0.03
GnD: Gilpin-----	90	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
GpE: Gilpin-----	55	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
Petros-----	35	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32



# Soil Survey of Morgan County, Tennessee

Table 12.--Building Site Development, Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpF: Gilpin-----	65	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
Petros-----	25	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32
GsF: Gilpin-----	35	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
Bouldin-----	30	Very limited Slope Content of large stones	1.00 0.35	Very limited Slope Content of large stones Cutbanks cave	1.00 0.35 0.10	Very limited Slope Content of large stones Droughty	1.00 0.99 0.34
Petros-----	25	Very limited Slope Depth to soft bedrock	1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.32
HeB: Hendon-----	90	Very limited Low strength	1.00	Somewhat limited Cutbanks cave	0.10	Not limited	
HeC: Hendon-----	85	Very limited Low strength	1.00	Somewhat limited Cutbanks cave	0.10	Not limited	
JnF: Jefferson-----	90	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 1.00	Very limited Slope Content of large stones	1.00 0.84
LbB: Lily-----	85	Somewhat limited Depth to hard bedrock	0.46	Very limited Depth to hard bedrock Cutbanks cave	1.00 0.10	Somewhat limited Depth to bedrock	0.46
LbC: Lily-----	85	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.04	Somewhat limited Depth to bedrock Slope	0.46 0.04

# Soil Survey of Morgan County, Tennessee

Table 12.--Building Site Development, Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LbD: Lily-----	85	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.46
LgC: Lily-----	65	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.04	Somewhat limited Depth to bedrock Slope	0.46 0.04
Gilpin-----	30	Very limited Low strength Slope	1.00 0.04	Somewhat limited Depth to soft bedrock Cutbanks cave Slope	0.84 0.10 0.04	Somewhat limited Depth to bedrock Slope Droughty	0.84 0.04 0.03
LgD: Lily-----	60	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	35	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
LgE: Lily-----	55	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.46
Gilpin-----	35	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.84 0.03
LmC: Lily-----	60	Somewhat limited Depth to hard bedrock Slope	0.46 0.04	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.04	Somewhat limited Depth to bedrock Slope	0.46 0.04
Ramsey-----	30	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.04	Very limited Depth to bedrock Droughty Slope	1.00 1.00 0.04

# Soil Survey of Morgan County, Tennessee

Table 12.--Building Site Development, Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
<b>LmD:</b>							
Lily-----	55	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00
<b>LmE:</b>							
Lily-----	50	Very limited Slope Depth to hard bedrock	1.00 0.46	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.46
Ramsey-----	40	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
<b>LoB:</b>							
Lonewood-----	85	Very limited Low strength	1.00	Somewhat limited Cutbanks cave	0.10	Not limited	
<b>LoC:</b>							
Lonewood-----	85	Very limited Low strength Slope	1.00 0.04	Somewhat limited Cutbanks cave Slope	0.10 0.04	Somewhat limited Slope	0.04
<b>Pp:</b>							
Pope-----	50	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding Depth to saturated zone	1.00 0.80 0.03	Very limited Flooding	1.00
Philo-----	45	Very limited Flooding Depth to saturated zone	1.00 0.03	Very limited Depth to saturated zone Cutbanks cave Flooding	1.00 1.00 0.80	Very limited Flooding Depth to saturated zone	1.00 0.03
<b>RaC:</b>							
Ramsey-----	80	Very limited Depth to hard bedrock Slope	1.00 0.04	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.04	Very limited Depth to bedrock Droughty Slope Content of large stones	1.00 1.00 0.04 0.01
Rock outcrop-----	15	Not rated		Not rated		Not rated	

# Soil Survey of Morgan County, Tennessee

Table 12.--Building Site Development, Part II--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RaD: Ramsey-----	75	Very limited Depth to hard bedrock Slope	1.00  1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00  1.00 0.10	Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Very limited Depth to hard bedrock Slope	1.00  1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00  1.00 0.10	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Very limited Low strength Shrink-swell Slope	1.00 0.50 0.04	Somewhat limited Depth to soft bedrock Cutbanks cave Slope Too clayey	0.95  0.10 0.04 0.02	Somewhat limited Depth to bedrock Droughty Slope	0.95 0.29 0.04
SeD: Sequoia-----	85	Very limited Slope Low strength Shrink-swell	1.00  1.00 0.50	Very limited Slope Depth to soft bedrock Cutbanks cave Too clayey	1.00  0.95  0.10 0.02	Very limited Slope Depth to bedrock Droughty	1.00  0.95 0.29
ShC: Shelocta-----	90	Somewhat limited Slope	0.04	Somewhat limited Cutbanks cave Slope	0.10 0.04	Somewhat limited Slope	0.04
ShD: Shelocta-----	90	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope	1.00
ShE: Shelocta-----	92	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Very limited Low strength	1.00	Somewhat limited Cutbanks cave Depth to soft bedrock	0.10 0.10	Somewhat limited Depth to bedrock	0.10

# Soil Survey of Morgan County, Tennessee

Table 12.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrC: Wernock-----	90	Very limited Low strength Slope	1.00 0.01	Somewhat limited Cutbanks cave Depth to soft bedrock Slope	0.10 0.10 0.01	Somewhat limited Depth to bedrock Slope	0.10 0.01

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Very limited Flooding Seepage Restricted permeability Depth to saturated zone	 1.00 1.00 0.50  0.08	Very limited Flooding Seepage	 1.00 1.00
Cotaco-----	35	Very limited Flooding Depth to saturated zone Seepage Restricted permeability	 1.00 1.00  1.00 0.50	Very limited Flooding Seepage Depth to saturated zone	 1.00 1.00 1.00
At: Atkins-----	90	Very limited Flooding Depth to saturated zone Seepage Restricted permeability	 1.00 1.00  1.00 0.78	Very limited Flooding Depth to saturated zone Seepage	 1.00 1.00  1.00
Bm: Bethesda-----	75	Very limited Restricted permeability Slope	 1.00  1.00	Very limited Slope Seepage	 1.00 0.53
Mines pit-----	25	Not rated		Not rated	
GnC: Gilpin-----	90	Very limited Depth to bedrock Restricted permeability Slope	 1.00 0.50  0.04	Very limited Depth to soft bedrock Slope Seepage	 1.00  1.00 0.53
GnD: Gilpin-----	90	Very limited Depth to bedrock Slope Restricted permeability	 1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	 1.00  1.00 0.53
GpE: Gilpin-----	55	Very limited Depth to bedrock Slope Restricted permeability	 1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	 1.00  1.00 0.53

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GpE: Petros-----	35	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 1.00
GpF: Gilpin-----	65	Very limited Depth to bedrock Slope Restricted permeability	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.53
Petros-----	25	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 1.00
GsF: Gilpin-----	35	Very limited Depth to bedrock Slope Restricted permeability	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.53
Bouldin-----	30	Very limited Slope Seepage Content of large stones	1.00 1.00 0.35	Very limited Slope Seepage Content of large stones	1.00 1.00 0.78
Petros-----	25	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 1.00
HeB: Hendon-----	90	Somewhat limited Restricted permeability	0.46	Somewhat limited Seepage Slope	0.53 0.32
HeC: Hendon-----	85	Somewhat limited Restricted permeability	0.46	Very limited Slope Seepage	1.00 0.53
JnF: Jefferson-----	90	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage Content of large stones	1.00 1.00 0.08

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LbB: Lily-----	85	Very limited Depth to bedrock Seepage	1.00 1.00	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 0.32
LbC: Lily-----	85	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 1.00
LbD: Lily-----	85	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
LgC: Lily-----	65	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 1.00
Gilpin-----	30	Very limited Depth to bedrock Restricted permeability Slope	1.00 0.50 0.04	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.53
LgD: Lily-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
Gilpin-----	35	Very limited Depth to bedrock Slope Restricted permeability	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.53
LgE: Lily-----	55	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
Gilpin-----	35	Very limited Depth to bedrock Slope Restricted permeability	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.53



# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>LmC:</b>					
Lily-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 1.00 1.00
Ramsey-----	30	Very limited Depth to bedrock Filtering capacity Seepage Slope	1.00 1.00 1.00 0.04	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 1.00 1.00
<b>LmD:</b>					
Lily-----	55	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
Ramsey-----	40	Very limited Depth to bedrock Filtering capacity Seepage Slope	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
<b>LmE:</b>					
Lily-----	50	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
Ramsey-----	40	Very limited Depth to bedrock Filtering capacity Slope Seepage	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
<b>LoB:</b>					
Lonewood-----	85	Somewhat limited Depth to bedrock Restricted permeability	0.52 0.46	Somewhat limited Seepage Slope Depth to soft bedrock	0.53 0.32 0.08
<b>LoC:</b>					
Lonewood-----	85	Somewhat limited Depth to bedrock Restricted permeability Slope	0.52 0.46 0.04	Very limited Slope Seepage Depth to soft bedrock	1.00 0.53 0.08

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Pp:					
Pope-----	50	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 0.08	Very limited Flooding Seepage	1.00 1.00
Philo-----	45	Very limited Flooding Depth to saturated zone Seepage Restricted permeability	1.00 1.00 1.00 0.46	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
RaC:					
Ramsey-----	80	Very limited Depth to bedrock Filtering capacity Seepage Slope	1.00 1.00 1.00 0.04	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated	
RaD:					
Ramsey-----	75	Very limited Depth to bedrock Filtering capacity Seepage Slope	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated	
RaF:					
Ramsey-----	70	Very limited Depth to bedrock Filtering capacity Slope Seepage	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated	
SeC:					
Sequoia-----	90	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to soft bedrock Slope	1.00 1.00
SeD:					
Sequoia-----	85	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope	1.00 1.00

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ShC: Shelocta-----	90	Very limited Seepage Slope	1.00 0.04	Very limited Slope Seepage	1.00 1.00
ShD: Shelocta-----	90	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage	1.00 1.00
ShE: Shelocta-----	90	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage	1.00 1.00
W: Water-----	100	Not rated		Not rated	
WrB: Wernock-----	90	Very limited Depth to bedrock Restricted permeability	1.00 0.46	Very limited Depth to soft bedrock Seepage Slope	1.00 0.53 0.18
WrC: Wernock-----	90	Very limited Depth to bedrock Restricted permeability Slope	1.00 0.46 0.01	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.53

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Very limited Flooding Depth to saturated zone Seepage Too clayey	1.00 1.00 1.00 0.50	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Too clayey Seepage	0.50 0.50
Cotaco-----	35	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone Seepage	0.86 0.50
At: Atkins-----	90	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
Bm: Bethesda-----	75	Very limited Slope Too clayey	1.00 0.50	Very limited Slope	1.00	Very limited Slope Too clayey Gravel content	1.00 0.50 0.42
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04
GnD: Gilpin-----	90	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
GpE: Gilpin-----	55	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
Petros-----	35	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.22

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpF: Gilpin-----	65	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
Petros-----	25	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.22
GsF: Gilpin-----	35	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
Bouldin-----	30	Very limited Slope Seepage Content of large stones Too clayey	1.00 1.00 0.82 0.50	Very limited Slope Seepage	1.00 1.00	Very limited Slope Content of large stones Seepage Too clayey	1.00 0.82 0.52 0.50
Petros-----	25	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.22
HeB: Hendon-----	90	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
HeC: Hendon-----	85	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
JnF: Jefferson-----	90	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage	1.00 0.52
LbB: Lily-----	85	Very limited Depth to bedrock Seepage	1.00 1.00	Very limited Seepage Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Seepage	1.00 0.52
LbC: Lily-----	85	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.04	Very limited Depth to bedrock Seepage Slope	1.00 0.52 0.04
LbD: Lily-----	85	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgC: Lily-----	65	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.04	Very limited Depth to bedrock Seepage Slope	1.00 0.52 0.04
Gilpin-----	30	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04
LgD: Lily-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
Gilpin-----	35	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
LgE: Lily-----	55	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Seepage Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
Gilpin-----	35	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
LmC: Lily-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.04	Very limited Depth to bedrock Seepage Slope	1.00 0.52 0.04
Ramsey-----	30	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Seepage Slope	1.00 0.52 0.04
LmD: Lily-----	55	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
Ramsey-----	40	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
LmE: Lily-----	50	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Seepage Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
<b>LmE:</b> Ramsey-----	40	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
<b>LoB:</b> Lonewood-----	85	Very limited Depth to bedrock Too clayey	1.00 0.50	Somewhat limited Depth to bedrock	0.08	Somewhat limited Too clayey Depth to bedrock	0.50 0.08
<b>LoC:</b> Lonewood-----	85	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04	Somewhat limited Depth to bedrock Slope	0.08 0.04	Somewhat limited Too clayey Depth to bedrock Slope	0.50 0.08 0.04
<b>Pp:</b> Pope-----	50	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Somewhat limited Seepage	0.22
Philo-----	45	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.68
<b>RaC:</b> Ramsey-----	80	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Seepage Slope	1.00 0.52 0.04
Rock outcrop-----	15	Not rated		Not rated		Not rated	
<b>RaD:</b> Ramsey-----	75	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
Rock outcrop-----	15	Not rated		Not rated		Not rated	
<b>RaF:</b> Ramsey-----	70	Very limited Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.52
Rock outcrop-----	15	Not rated		Not rated		Not rated	
<b>SeC:</b> Sequoia-----	90	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Too clayey Hard to compact Slope	1.00 1.00 1.00 0.04

# Soil Survey of Morgan County, Tennessee

Table 13.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SeD: Sequoia-----	85	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Too clayey Hard to compact Slope	1.00 1.00 1.00 1.00
ShC: Shelocta-----	90	Very limited Seepage Too clayey Slope	1.00 0.50 0.04	Very limited Seepage Slope	1.00 0.04	Somewhat limited Too clayey Seepage Gravel content Slope	0.50 0.22 0.20 0.04
ShD: Shelocta-----	90	Very limited Slope Seepage Too clayey	1.00 1.00 0.50	Very limited Slope Seepage	1.00 1.00	Very limited Slope Too clayey Seepage Gravel content	1.00 0.50 0.22 0.20
ShE: Shelocta-----	90	Very limited Slope Seepage Too clayey	1.00 1.00 0.50	Very limited Slope Seepage	1.00 1.00	Very limited Slope Too clayey Seepage Gravel content	1.00 0.50 0.22 0.20
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Very limited Depth to bedrock Too clayey	1.00 0.50	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey	1.00 0.50
WrC: Wernock-----	90	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.01	Very limited Depth to bedrock Slope	1.00 0.01	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.01



# Soil Survey of Morgan County, Tennessee

Table 14.—Construction Materials, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Ac:					
Allegheny-----	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Cotaco-----	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
At:					
Atkins-----	90	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.01
Bm:					
Bethesda-----	75	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Mines pit-----	25	Not rated		Not rated	
GnC:					
Gilpin-----	90	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
GnD:					
Gilpin-----	90	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
GpE:					
Gilpin-----	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Petros-----	35	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.32	Thickest layer	0.00
GpF:					
Gilpin-----	65	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Petros-----	25	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.32	Thickest layer	0.00

# Soil Survey of Morgan County, Tennessee

Table 14.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
GsF: Gilpin-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
Bouldin-----	30	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Petros-----	25	Fair Thickest layer Bottom layer	0.00 0.32	Poor Bottom layer Thickest layer	0.00 0.00
HeB: Hendon-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
HeC: Hendon-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
JnF: Jefferson-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.04
LbB: Lily-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
LbC: Lily-----	85	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
LbD: Lily-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
LgC: Lily-----	65	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
Gilpin-----	30	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
LgD: Lily-----	60	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
Gilpin-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00

# Soil Survey of Morgan County, Tennessee

Table 14.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
LgE:					
Lily-----	55	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Gilpin-----	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
LmC:					
Lily-----	60	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Ramsey-----	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
LmD:					
Lily-----	60	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Ramsey-----	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
LmE:					
Lily-----	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Ramsey-----	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
LoB:					
Lonewood-----	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LoC:					
Lonewood-----	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Pp:					
Pope-----	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Philo-----	45	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
RaC:					
Ramsey-----	80	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Rock outcrop-----	15	Not rated		Not rated	

# Soil Survey of Morgan County, Tennessee

Table 14.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
RaD: Ramsey-----	75	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.04
Rock outcrop-----	15	Not rated		Not rated	
RaF: Ramsey-----	75	Poor Thickest layer Bottom layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.04
Rock outcrop-----	15	Not rated		Not rated	
SeC: Sequoia-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
SeD: Sequoia-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
ShC: Shelocta-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
ShD: Shelocta-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
ShE: Shelocta-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
W: Water-----	100	Not rated		Not rated	
WrB: Wernock-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
WrC: Wernock-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	55	Fair Too acid	0.54	Poor Low strength	0.00	Fair Hard to reclaim (rock fragments) Too acid	0.20 0.98
Cotaco-----	35	Fair Too acid Water erosion	0.54 0.99	Poor Low strength Wetness depth	0.00 0.53	Poor Hard to reclaim (rock fragments) Wetness depth Too acid	0.00 0.53 0.98
At: Atkins-----	90	Fair Too acid Organic matter content low	0.20 0.50	Poor Wetness depth Low strength	0.00 0.00	Poor Wetness depth Too acid	0.00 0.76
Bm: Bethesda-----	75	Fair Organic matter content low Too acid Droughty	0.02 0.12 0.42	Poor Slope	0.00	Poor Rock fragments Slope Hard to reclaim (rock fragments) Too acid	0.00 0.00 0.50 0.59
Mines pit-----	20	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	0.14 0.16 0.50 0.88 0.98	Poor Depth to bedrock Low strength	0.00 0.00	Fair Depth to bedrock Too clayey Too acid Rock fragments Slope	0.16 0.70 0.76 0.94 0.96
GnD: Gilpin-----	90	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	0.14 0.16 0.50 0.88 0.98	Poor Depth to bedrock Low strength Slope	0.00 0.00 0.98	Poor Slope Depth to bedrock Too clayey Too acid Rock fragments	0.00 0.16 0.70 0.76 0.94
GpE: Gilpin-----	55	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	0.14 0.16 0.50 0.88 0.98	Poor Depth to bedrock Slope Low strength	0.00 0.00 0.00	Poor Slope Depth to bedrock Too clayey Too acid Rock fragments	0.00 0.16 0.70 0.76 0.94

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpE: Petros-----	35	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock Slope	 0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	 0.00 0.00 0.00 0.98
GpF: Gilpin-----	65	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	 0.14 0.16 0.50 0.88  0.98	Poor Slope Depth to bedrock Low strength	 0.00 0.00 0.00	Poor Slope Depth to bedrock Too clayey Too acid Rock fragments	 0.00 0.16 0.70 0.76 0.94
Petros-----	25	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock Slope	 0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	 0.00 0.00 0.00 0.98
GsF: Gilpin-----	35	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	 0.14 0.16 0.50 0.88  0.98	Poor Slope Depth to bedrock Low strength	 0.00 0.00 0.00	Poor Slope Depth to bedrock Too clayey Too acid Rock fragments	 0.00 0.16 0.70 0.76 0.94
Bouldin-----	30	Poor Stone content Organic matter content low Too acid Cobble content	 0.00 0.12  0.54 0.92	Poor Slope Stone content Cobble content	 0.00 0.00 0.39	Poor Slope Rock fragments Hard to reclaim (rock fragments) Too acid	 0.00 0.00 0.00  0.98
Petros-----	25	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock Slope	 0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	 0.00 0.00 0.00 0.98
HeB: Hendon-----	90	Fair Organic matter content low Too acid Too clayey Water erosion	 0.12  0.50 0.50 0.99	Poor Low strength	 0.00	Fair Too clayey Too acid	 0.29 0.76

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HeC: Hendon-----	85	Fair Organic matter content low Too acid Too clayey Water erosion	 0.12 0.50 0.50 0.99	Poor Low strength	 0.00	Fair Too clayey Too acid	 0.29 0.76
JnF: Jefferson-----	90	Fair Organic matter content low Too acid	 0.12 0.32	Poor Slope Cobble content	 0.00 0.59	Poor Slope Hard to reclaim (rock fragments) Rock fragments Too acid	 0.00 0.00 0.00 0.88
LbB: Lily-----	85	Fair Organic matter content low Too acid Depth to bedrock Droughty Too clayey	 0.12 0.50 0.54 0.56 0.92	Poor Depth to bedrock Low strength	 0.00 0.00	Fair Too clayey Depth to bedrock Too acid	 0.53 0.54 0.59
LbC: Lily-----	85	Fair Organic matter content low Too acid Depth to bedrock Droughty Too clayey	 0.12 0.50 0.54 0.56 0.92	Poor Depth to bedrock Low strength	 0.00 0.00	Fair Too clayey Depth to bedrock Too acid Slope	 0.53 0.54 0.59 0.96
LbD: Lily-----	85	Fair Organic matter content low Too acid Depth to bedrock Droughty Too clayey	 0.12 0.50 0.54 0.56 0.92	Poor Depth to bedrock Low strength Slope	 0.00 0.00 0.98	Poor Slope Too clayey Depth to bedrock Too acid	 0.00 0.53 0.54 0.59
LgC: Lily-----	65	Fair Organic matter content low Too acid Depth to bedrock Droughty Too clayey	 0.12 0.50 0.54 0.56 0.92	Poor Depth to bedrock Low strength	 0.00 0.00	Fair Too clayey Depth to bedrock Too acid Slope	 0.53 0.54 0.59 0.96
Gilpin-----	30	Fair Droughty Depth to bedrock Too acid Organic matter content low Too clayey	 0.14 0.16 0.50 0.88 0.98	Poor Depth to bedrock Low strength	 0.00 0.00	Fair Depth to bedrock Too clayey Too acid Rock fragments Slope	 0.16 0.70 0.76 0.94 0.96

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgD: Lily-----	60	Fair		Poor		Poor	
		Organic matter content low	0.12	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Low strength	0.00	Too clayey	0.53
		Depth to bedrock	0.54	Slope	0.98	Depth to bedrock	0.54
		Droughty	0.56			Too acid	0.59
		Too clayey	0.92				
Gilpin-----	35	Fair		Poor		Poor	
		Droughty	0.14	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.16	Low strength	0.00	Depth to bedrock	0.16
		Too acid	0.50	Slope	0.98	Too clayey	0.70
		Organic matter content low	0.88			Too acid	0.76
		Too clayey	0.98			Rock fragments	0.94
LgE: Lily-----	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Too clayey	0.53
		Depth to bedrock	0.54	Low strength	0.00	Depth to bedrock	0.54
		Droughty	0.56			Too acid	0.59
		Too clayey	0.92				
Gilpin-----	35	Fair		Poor		Poor	
		Droughty	0.14	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.16	Slope	0.00	Depth to bedrock	0.16
		Too acid	0.50	Low strength	0.00	Too clayey	0.70
		Organic matter content low	0.88			Too acid	0.76
		Too clayey	0.98			Rock fragments	0.94
LmC: Lily-----	60	Fair		Poor		Fair	
		Organic matter content low	0.12	Depth to bedrock	0.00	Too clayey	0.53
		Too acid	0.50	Low strength	0.00	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
		Droughty	0.56			Slope	0.96
		Too clayey	0.92				
Ramsey-----	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00			Rock fragments	0.08
		Organic matter content low	0.12			Slope	0.96
		Too acid	0.54			Too acid	0.98
LmD: Lily-----	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Low strength	0.00	Too clayey	0.53
		Depth to bedrock	0.54	Slope	0.98	Depth to bedrock	0.54
		Droughty	0.56			Too acid	0.59
		Too clayey	0.92				



# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LmD: Ramsey-----	40	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock Slope	 0.00 0.98	Poor Depth to bedrock Slope Rock fragments Too acid	 0.00 0.00 0.08 0.98
LmE: Lily-----	50	Fair Organic matter content low Too acid Depth to bedrock Droughty Too clayey	 0.12  0.50 0.54 0.56 0.92	Poor Depth to bedrock Slope Low strength	 0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock Too acid	 0.00 0.53 0.54 0.59
Ramsey-----	40	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock Slope	 0.00 0.00	Poor Slope Depth to bedrock Rock fragments Too acid	 0.00 0.00 0.08 0.98
LoB: Lonewood-----	85	Fair Organic matter content low Too acid Water erosion	 0.12  0.50 0.99	Poor Low strength Depth to bedrock	 0.00 0.92	Fair Too acid	 0.98
LoC: Lonewood-----	85	Fair Organic matter content low Too acid Water erosion	 0.12  0.50 0.99	Poor Low strength Depth to bedrock	 0.00 0.92	Fair Slope Too acid	 0.96 0.98
Pp: Pope-----	50	Fair Organic matter content low Too acid Water erosion	 0.12  0.54 0.99	Good		Poor Hard to reclaim (rock fragments) Too acid	 0.00 0.98
Philo-----	45	Fair Organic matter content low Too acid Water erosion	 0.12  0.54 0.99	Fair Wetness depth	 0.76	Fair Hard to reclaim (rock fragments) Wetness depth Too acid	 0.74 0.76 0.98
RaC: Ramsey-----	80	Poor Droughty Depth to bedrock Organic matter content low Too acid	 0.00 0.00 0.12  0.54	Poor Depth to bedrock	 0.00	Poor Depth to bedrock Rock fragments Slope Too acid	 0.00 0.12 0.96 0.98
Rock outcrop-----	15	Not rated		Not rated		Not rated	

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RaD: Ramsey-----	75	Poor Droughty Depth to bedrock Organic matter content low Too acid	0.00 0.00 0.12 0.54	Poor Depth to bedrock Slope	0.00 0.98	Poor Depth to bedrock Slope Rock fragments Too acid	0.00 0.00 0.12 0.98
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Poor Droughty Depth to bedrock Organic matter content low Too acid	0.00 0.00 0.12 0.54	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Depth to bedrock Rock fragments Too acid	0.00 0.00 0.12 0.98
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Poor Too clayey Droughty Depth to bedrock Organic matter content low Too acid Water erosion	0.00 0.05 0.05 0.12 0.54 0.99	Poor Low strength Depth to bedrock	0.00 0.00	Poor Too clayey Depth to bedrock Slope Too acid	0.00 0.05 0.96 0.98
SeD: Sequoia-----	85	Poor Too clayey Droughty Depth to bedrock Organic matter content low Too acid Water erosion	0.00 0.05 0.05 0.12 0.54 0.99	Poor Low strength Depth to bedrock Slope	0.00 0.00 0.98	Poor Slope Too clayey Depth to bedrock Too acid	0.00 0.00 0.05 0.98
ShC: Shelocta-----	90	Fair Organic matter content low Too acid Too clayey	0.12 0.54 0.98	Poor Low strength	0.00	Poor Rock fragments Too clayey Hard to reclaim (rock fragments) Slope Too acid	0.00 0.57 0.88 0.96 0.98
ShD: Shelocta-----	90	Fair Organic matter content low Too acid Too clayey	0.12 0.54 0.98	Poor Low strength	0.00	Poor Slope Rock fragments Too clayey Hard to reclaim (rock fragments) Too acid	0.00 0.00 0.57 0.99 0.98

# Soil Survey of Morgan County, Tennessee

Table 14.--Construction Materials, Part II--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ShE: Shelocta-----	90	Fair Organic matter content low Too acid Too clayey	0.12 0.54 0.98	Poor Slope Low strength	0.00 0.00	Poor Slope Rock fragments Too clayey Hard to reclaim (rock fragments) Too acid	0.00 0.00 0.57 0.88 0.98
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Fair Organic matter content low Too acid Depth to bedrock Too clayey Water erosion	0.12 0.50 0.90 0.92 0.99	Poor Depth to bedrock Low strength	0.00 0.00	Fair Too clayey Too acid Depth to bedrock	0.53 0.88 0.90
WrC: Wernock-----	90	Fair Organic matter content low Too acid Depth to bedrock Too clayey Water erosion	0.12 0.50 0.90 0.92 0.99	Poor Depth to bedrock Low strength	0.00 0.00	Fair Too clayey Too acid Depth to bedrock Slope	0.53 0.88 0.90 0.99

# Soil Survey of Morgan County, Tennessee

Table 15.—Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ac: Allegheny-----	65	Very limited Seepage	1.00	Very limited Piping	1.00	Very limited No ground water	1.00
Cotaco-----	35	Very limited Seepage	1.00	Very limited Piping Depth to saturated zone	1.00 0.99	Very limited Cutbanks cave Depth to water	1.00 0.01
At: Atkins-----	90	Very limited Seepage	1.00	Very limited Depth to saturated zone Piping Seepage	1.00 1.00 0.01	Somewhat limited Cutbanks cave	0.10
Bm: Bethesda-----	75	Somewhat limited Slope Seepage	0.97 0.72	Not limited		Very limited No ground water	1.00
Mines pit-----	25	Not rated		Not rated		Not rated	
GnC: Gilpin-----	90	Somewhat limited Seepage Depth to bedrock	0.72 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
GnD: Gilpin-----	90	Somewhat limited Seepage Depth to bedrock Slope	0.72 0.26 0.04	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
GpE: Gilpin-----	55	Somewhat limited Seepage Slope Depth to bedrock	0.72 0.41 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
Petros-----	35	Somewhat limited Depth to bedrock Slope	0.61 0.41	Very limited Thin layer Seepage	1.00 0.32	Very limited No ground water	1.00
GpF: Gilpin-----	65	Very limited Slope Seepage Depth to bedrock	1.00 0.72 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
Petros-----	25	Very limited Slope Depth to bedrock	1.00 0.61	Very limited Thin layer Seepage	1.00 0.32	Very limited No ground water	1.00

# Soil Survey of Morgan County, Tennessee

Table 15.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsF: Gilpin-----	35	Very limited Slope Seepage Depth to bedrock	1.00 0.72 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
Bouldin-----	30	Very limited Seepage Slope	1.00 1.00	Somewhat limited Content of large stones	0.35	Very limited No ground water	1.00
Petros-----	25	Somewhat limited Slope Depth to bedrock	0.94 0.61	Very limited Thin layer Seepage	1.00 0.32	Very limited No ground water	1.00
HeB: Hendon-----	90	Somewhat limited Seepage	0.72	Somewhat limited Piping	0.64	Very limited No ground water	1.00
HeC: Hendon-----	85	Somewhat limited Seepage	0.72	Somewhat limited Piping	0.64	Very limited No ground water	1.00
JnF: Jefferson-----	90	Very limited Seepage Slope	1.00 0.72	Somewhat limited Seepage	0.04	Very limited No ground water	1.00
LbB: Lily-----	85	Very limited Seepage Depth to bedrock	1.00 0.86	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
LbC: Lily-----	85	Very limited Seepage Depth to bedrock	1.00 0.86	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
LbD: Lily-----	85	Very limited Seepage Depth to bedrock Slope	1.00 0.86 0.04	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
LgC: Lily-----	65	Very limited Seepage Depth to bedrock	1.00 0.86	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
Gilpin-----	30	Somewhat limited Seepage Depth to bedrock	0.72 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
LgD: Lily-----	60	Very limited Seepage Depth to bedrock Slope	1.00 0.86 0.04	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00

# Soil Survey of Morgan County, Tennessee

Table 15.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgD: Gilpin-----	35	Somewhat limited Seepage Depth to bedrock Slope	0.72 0.26 0.04	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
LgE: Lily-----	55	Very limited Seepage Depth to bedrock Slope	1.00 0.86 0.41	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
Gilpin-----	35	Somewhat limited Seepage Slope Depth to bedrock	0.72 0.41 0.26	Somewhat limited Piping Thin layer	0.97 0.96	Very limited No ground water	1.00
LmC: Lily-----	60	Very limited Seepage Depth to bedrock	1.00 0.86	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
Ramsey-----	30	Very limited Depth to bedrock	1.00	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
LmD: Lily-----	55	Very limited Seepage Depth to bedrock Slope	1.00 0.86 0.04	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
Ramsey-----	40	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
LmE: Lily-----	50	Very limited Seepage Depth to bedrock Slope	1.00 0.86 0.41	Very limited Piping Thin layer	1.00 0.86	Very limited No ground water	1.00
Ramsey-----	40	Very limited Depth to bedrock Slope	1.00 0.41	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
LoB: Lonewood-----	85	Somewhat limited Seepage Depth to bedrock	0.72 0.01	Somewhat limited Piping Thin layer	0.97 0.02	Very limited No ground water	1.00
LoC: Lonewood-----	85	Somewhat limited Seepage Depth to bedrock	0.72 0.01	Somewhat limited Piping Thin layer	0.97 0.02	Very limited No ground water	1.00
Pp: Pope-----	50	Very limited Seepage	1.00	Very limited Piping Seepage	1.00 0.04	Very limited No ground water	1.00

# Soil Survey of Morgan County, Tennessee

Table 15.-Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pp: Philo-----	45	Very limited Seepage	1.00	Very limited Piping Depth to saturated zone Seepage	1.00 0.95 0.02	Very limited Cutbanks cave Depth to water	1.00 0.02
RaC: Ramsey-----	80	Very limited Depth to bedrock	1.00	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaD: Ramsey-----	75	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
RaF: Ramsey-----	75	Very limited Depth to bedrock Slope	1.00 0.72	Very limited Thin layer Seepage	1.00 0.04	Very limited No ground water	1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
SeC: Sequoia-----	90	Somewhat limited Depth to bedrock Seepage	0.34 0.03	Somewhat limited Thin layer Hard to pack	0.99 0.01	Very limited No ground water	1.00
SeD: Sequoia-----	85	Somewhat limited Depth to bedrock Slope Seepage	0.34 0.04 0.03	Somewhat limited Thin layer Hard to pack	0.99 0.01	Very limited No ground water	1.00
ShC: Shelocta-----	90	Very limited Seepage	1.00	Very limited Piping	0.99	Very limited No ground water	1.00
ShD: Shelocta-----	90	Very limited Seepage Slope	1.00 0.03	Very limited Piping	0.99	Very limited No ground water	1.00
ShE: Shelocta-----	90	Very limited Seepage Slope	1.00 0.41	Very limited Piping	0.99	Very limited No ground water	1.00
W: Water-----	100	Not rated		Not rated		Not rated	
WrB: Wernock-----	90	Somewhat limited Seepage Depth to bedrock	0.72 0.04	Somewhat limited Piping Thin layer	0.95 0.70	Very limited No ground water	1.00

# Soil Survey of Morgan County, Tennessee

Table 15.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrC: Wernock-----	90	Somewhat limited Seepage Depth to bedrock	0.72 0.04	Somewhat limited Piping Thin layer	0.95 0.70	Very limited No ground water	1.00



Table 16.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
	In		Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200	Pct		
Ac: Allegheny-----					Pct	Pct							
	0-24	Loam	CL, ML, CL-ML	A-4	0	0	90-100	80-100	65-100	55-95		15-35	NP-10
	24-39	Clay loam, loam	CL, ML, SC, SM, CL-ML	A-4, A-6	0	0	90-100	80-100	65-95	35-80		15-40	NP-15
	39-45	Clay loam, loam, sandy clay loam, gravelly clay loam	CL, ML, SC, SM, CL-ML, GC	A-4, A-6	0	0	68-92	57-90	46-90	20-72		15-35	NP-15
	45-60	Gravelly fine sandy loam	SM, SC-SM, SC, GC-GM	A-2-4, A-2, A-4	0	0-45	55-100	55-100	50-95	15-45		15-30	NP-10
Cotaco-----	0-24	Loam	CL-ML, ML, SC-SM, SM	A-4	0	0	80-100	75-95	55-85	35-80		15-30	NP-7
	24-36	Clay loam, loam	CL	A-6, A-4	0	0	95-100	85-100	75-90	65-85		29-48	10-23
	36-45	Gravelly clay loam	SC, SM, GC, CL	A-4, A-6	0	0-10	60-100	50-95	40-90	20-80		15-40	NP-15
	45-60	Very gravelly fine sandy loam	SM, SC-SM, SC, GC-GM	A-2-4, A-2, A-4	0	0-45	55-100	55-100	50-95	15-45		15-30	NP-10
At: Atkins-----	0-36	Silt loam	CL-ML, CL, ML, SC, SM	A-4, A-6	0	0	90-100	80-100	60-95	45-75		20-40	3-20
	36-46	Silty clay loam, silt loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	65-100	45-85		20-40	3-20
	46-62	Fine sandy loam	CL-ML, CL, GM, ML, SM	A-2, A-4, A-6	0	0	60-100	60-100	50-95	30-85		20-40	1-15
Bm: Bethesda-----	0-2	Channery loam	CL-ML, GC-GM, GM, ML	A-4, A-6	0-20	0-15	65-90	55-80	50-80	35-75		25-40	4-14
	2-45	Very channery clay loam, very channery silty clay loam, channery clay loam	CL, GC-GM, GM, ML	A-2, A-4, A-6, A-7	0-20	10-30	45-80	25-65	25-65	20-60		24-50	3-23
	45-60	Channery loam, channery clay loam	CL, GC-GM, GM, ML	A-2, A-4, A-6, A-7	10-20	10-30	45-80	25-65	25-65	20-60		24-50	3-23
Mines pit.													

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GnC: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
GnD: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
GpE: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
Petros-----	0-2	Channery silt loam	CL, CL-ML, GM, ML	A-4	0	0-15	60-80	55-75	50-70	40-60	15-30	NP-8
	2-8	Very channery silt loam	GC, GC-GM, GM, GP-GM	A-1, A-2, A-4, A-6	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	8-16	Extremely channery silt loam	GP-GM, GC-GM, GC, GM	A-4	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	16-26	weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GpF: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
Petros-----	0-2	Channery silt loam	CL, CL-ML, GM, ML	A-4	0	0-15	60-80	55-75	50-70	40-60	15-30	NP-8
	2-8	Very channery silt loam	GC, GC-GM, GM, GP-GM	A-1, A-2, A-4, A-6	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	8-16	Extremely channery silt loam	GP-GM, GC-GM, GC, GM	A-4	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	16-26	weathered bedrock	---	---	---	---	---	---	---	---	---	---
Gsf: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
Bouldin-----	0-2	Flaggy loam	GM, GC-GM, SM, SC-SM, ML	A-2, A-4	0-20	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	2-30	Channery loam, very channery loam	SC-SM, ML, GM, GC-GM, SM	A-2, A-4	0-20	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	30-80	Extremely stony clay loam, extremely flaggy clay loam	SC, GC	A-2, A-4, A-6	0-20	30-55	55-75	45-65	35-60	25-50	25-39	8-16

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GsF: Petros-----	0-2	Channery silt loam	CL, CL-ML, GM, ML	A-4	0	0-15	60-80	55-75	50-70	40-60	15-30	NP-8
	2-8	Very channery silt loam	GC, GC-GM, GM, GP-GM	A-1, A-2, A-4, A-6	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	8-16	Extremely channery silt loam	GP-GM, GC-GM, GC, GM	A-4	0	0	25-49	20-45	15-40	10-36	20-39	3-17
	16-26	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
HeB: Hendon-----	0-3	Silt loam, loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	3-12	Silt loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	12-24	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	24-36	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	36-60	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
HeC: Hendon-----	0-3	Silt loam, loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	3-12	Silt loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	12-24	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	24-36	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	36-60	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
JnF: Jefferson-----	0-7	Cobbly loam	CL, GM, ML, SM	A-2, A-4	0-10	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	CL, ML, SC, SM	A-2, A-4, A-6	0-10	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-65	Cobbly loam, cobbly clay loam, very gravelly sandy loam	GC-GM, GM, ML, SM	A-1, A-2, A-4	0-10	10-35	55-75	50-75	35-70	20-60	20-35	2-10
LbB: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct				Pct		
LbC: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC,	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
LbD: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC,	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
LgC: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC,	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Gilpin-----	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	Silty clay loam, clay	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-25	Silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-4, A-6, A-2	0	0	50-95	45-90	35-85	30-80	20-40	4-15
LgD: Lily-----	25-35	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC,	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LgD: Gilpin-----	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-35	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
LgE: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
Gilpin-----	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-35	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
LmC: Lily-----	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
LmC: Lily-----	21-35	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
LmC: Lily-----	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-6	silt loam	CL, CL-ML	A-4, A-6	0	0	80-95	75-90	70-85	65-80	20-40	4-15
	6-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-35	silt loam, channery silty clay loam, channery silt loam	CL, CL-ML, GC, SC	A-2, A-4, A-6	0	0	50-95	45-90	35-85	30-80	20-40	4-15
LmC: Lily-----	25-35	weathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ImC: Ramsey-----	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-77	30-70	0-25	NP-7
	10-16	Channery sandy loam, sandy loam	SC-SM, ML, SM, CL-ML	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
ImD: Lily-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-77	30-70	0-25	NP-7
ImE: Lily-----	10-16	Channery sandy loam, sandy loam	SC-SM, ML, SM, CL-ML	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
	0-3	Loam	CL, CL-ML, ML	A-4	0	0	90-100	85-100	70-95	55-80	0-35	NP-10
	3-30	Clay loam, loam	CL, ML, SC, SM	A-4, A-6	0	0	90-100	85-100	75-100	40-80	0-35	3-15
	30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ImE: Ramsey-----	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-77	30-70	0-25	NP-7
	10-16	Channery sandy loam, sandy loam	SC-SM, ML, SM, CL-ML	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
LoB: Lonewood-----	0-20	Silt loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	3-9
	20-28	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	28-55	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	55-65	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
LoC: Lonewood-----	0-20	Silt loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	3-9
	20-28	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	28-55	Clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	55-65	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Pp: Pope-----	0-8	Loam	CL, CL-ML, ML, SM	A-4	0	0	85-100	75-100	70-100	45-90	0-30	NP-10
	8-43	Fine sandy loam, sandy loam, loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	95-100	80-100	51-95	25-75	0-30	NP-7
	43-60	Very gravelly sandy loam	GM, ML, SC-SM, SM	A-1, A-2, A-4	0	0-20	45-100	35-100	30-95	15-70	0-30	NP-7
Philo-----	0-36	Loam	CL, CL-ML, ML, SM	A-4	0	0	85-100	75-100	70-100	45-90	0-30	NP-10
	36-48	Fine sandy loam, sandy loam	CL-ML, ML, SM	A-4	0	0	95-100	75-100	70-90	45-80	20-35	1-10
	48-60	Gravelly sandy loam	CL-ML, GM, ML, SM	A-2, A-4	0	0	60-95	50-90	40-85	30-80	15-30	1-10



Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
RaC: Ramsey-----	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	10-16	Channery sandy loam, sandy loam	GM, ML, SM, GC-GM	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16-18	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
RaD: Ramsey-----	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-77	30-70	0-25	NP-7
	10-16	Channery sandy loam, sandy loam	SC-SM, ML, SM, CL-ML	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
RaF: Ramsey-----	0-4	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-75	30-70	0-25	NP-7
	4-10	Sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-95	60-77	30-70	0-25	NP-7
	10-16	Channery sandy loam, sandy loam	SC-SM, ML, SM, CL-ML	A-4, A-1, A-2	0	0-10	65-95	60-90	40-75	20-60	15-30	NP-7
	16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SeC: Sequoia-----	0-5	silt loam	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-9	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	9-16	silty clay, channery silty clay	CH, CL	A-7	0	0	70-100	65-100	60-100	55-95	43-74	20-40
	16-23	Channery silty clay	CH, CL	A-6, A-7	0	0-2	65-85	60-80	55-80	50-70	37-65	13-35
	23-33	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
SeD: Sequoia-----	0-5	silt loam	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-9	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	9-16	silty clay, channery silty clay	CL, CH	A-7	0	0	70-100	65-100	60-100	55-95	43-74	20-40
	16-23	Channery silty clay	CH, CL	A-6, A-7	0	0-2	65-85	60-80	55-80	50-70	37-65	13-35
	23-33	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
ShC: Shelockta-----	0-10	Loam, silt loam	CL-ML, ML	A-4	0	0	80-95	75-95	60-95	55-90	0-35	NP-10
	10-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-65	Channery silt loam, channery silty clay loam	CL, GC, GM, ML	A-1-b, A-2, A-4, A-6	0	0-10	40-85	35-70	25-70	20-65	20-40	3-20
ShD: Shelockta-----	0-10	Loam, silt loam	CL-ML, ML	A-4	0	0	80-95	75-95	60-95	55-90	0-35	NP-10
	10-21	silty clay loam, clay loam	CL	A-4, A-6	0	0	80-100	75-100	70-95	60-90	25-40	8-17
	21-65	Channery silt loam, channery silty clay loam	CL, GC, GM, ML	A-1-b, A-2, A-4, A-6	0	0-10	40-85	35-70	25-70	20-65	20-40	3-20

Table 16.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
ShE: Shelockta-----	In				Pct	Pct					Pct	
	0-10 10-21	Loam, silt loam Silty clay loam, clay loam	CL-ML, ML CL	A-4 A-4, A-6	0 0	0 0	80-95 80-100	75-95 75-100	60-95 70-95	55-90 60-90	0-35 25-40	NP-10 8-17
	21-65	Channery silt loam, channery silty clay loam	CL, GC, GM, ML	A-1-b, A-2, A-4, A-6	0	0-10	40-85	35-70	25-70	20-65	20-40	3-20
W. Water												
WrB: Wernock-----	0-12 12-35	Silt loam Silt loam, silty clay loam	CL, ML CL, CL-ML, ML	A-4, A-6 A-4, A-6	0 0	0 0	90-100 90-100	85-100 85-100	75-95 75-100	55-90 55-95	25-35 25-45	3-11 3-22
	35-45	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
WrC: Wernock-----	0-12 12-35	Silt loam Silt loam, silty clay loam	CL, ML CL, CL-ML, ML	A-4, A-6 A-4, A-6	0 0	0 0	90-100 90-100	85-100 85-100	75-95 75-100	55-90 55-95	25-35 25-45	3-11 3-22
	35-45	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 17.--Physical and Chemical Properties

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct				pH
Ac: Allegheny-----	0-24	7-27	1.20-1.40	0.6-2	0.12-0.22	0.0-2.9	1.0-4.0	.32	.32	4	3.6-5.5
	24-39	18-40	1.20-1.50	0.6-2	0.13-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	39-45	18-35	1.20-1.50	0.6-2	0.13-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	45-60	5-20	1.40-1.70	2-6	0.07-0.20	0.0-2.9	---	.20	.20		5.1-6.5
Cotaco-----	0-24	7-27	1.20-1.40	0.6-2	0.12-0.20	0.0-2.9	0.5-4.0	.37	.43	3	3.6-5.5
	24-36	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	36-45	28-40	1.20-1.50	0.6-2	0.07-0.15	0.0-2.9	---	.28	.32		3.6-5.5
	45-60	5-20	1.40-1.70	2-6	0.07-0.20	0.0-2.9	---	.20	.20		5.1-6.5
At: Atkins-----	0-36	7-27	1.20-1.40	0.6-2	0.14-0.22	0.0-2.9	2.0-4.0	.32	.32	5	4.5-5.5
	36-46	7-40	1.20-1.50	0.06-2	0.14-0.18	0.0-2.9	---	.32	.32		4.5-5.5
	46-65	7-20	1.20-1.50	0.2-6	0.08-0.18	0.0-2.9	---	.28	.32		4.5-5.5
Bm: Bethesda-----	0-23	18-27	1.40-1.55	0.6-2	0.10-0.16	0.0-2.9	0.0-0.5	.28	.49	5	3.6-5.5
	23-45	18-35	1.60-1.90	0.2-0.6	0.04-0.10	0.0-2.9	---	.32	.64		3.6-5.5
	45-60	7-40	1.60-1.90	0.2-0.6	0.04-0.10	0.0-2.9	---	.32	.64		3.6-5.5
Mines pit.											
GnC: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---
GnD: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---
GpE: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---

Soil Survey of Morgan County, Tennessee

Table 17.--Physical and Chemical Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct				pH
GpE: Petros-----	0-2	12-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0	.20	.28	2	4.5-5.5
	2-8	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	8-16	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	16-18	---	---	0.00-0.01	---	---	---	---	---		---
GpF: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---
Petros-----	0-2	12-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0	.20	.28	2	4.5-5.5
	2-8	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	8-16	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	16-18	---	---	0.00- 0.00	---	---	---	---	---		---
GsF: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---
Bouldin-----	0-17	7-27	1.35-1.50	2-6	0.06-0.10	0.0-2.9	1.0-3.0	.20	.28	5	4.5-5.5
	17-30	7-27	1.35-1.50	2-6	0.06-0.10	0.0-2.9	---	.20	.28		4.5-5.5
	30-65	7-40	1.40-1.55	2-6	0.06-0.10	0.0-2.9	---	.20	.28		4.5-5.5
Petros-----	0-2	12-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0	.20	.28	2	4.5-5.5
	2-8	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	8-16	12-27	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	---	.15	.24		4.5-5.5
	16-18	---	---	0.00- 0.00	---	---	---	---	---		---
HeB: Hendon-----	0-3	12-25	1.30-1.45	0.6-2	0.17-0.21	0.0-2.9	1.0-3.0	.37	.37	5	4.5-5.5
	3-12	12-25	1.30-1.45	0.6-2	0.17-0.21	0.0-2.9	---	.37	.37		4.5-5.5
	12-24	7-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	24-36	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
HeC: Hendon-----	36-60	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	0-3	12-25	1.30-1.45	0.6-2	0.17-0.21	0.0-2.9	1.0-3.0	.37	.37	5	4.5-5.5
	3-12	12-25	1.30-1.45	0.6-2	0.17-0.21	0.0-2.9	---	.37	.37		4.5-5.5
HeC: Hendon-----	12-24	7-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	24-36	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	36-60	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5

Table 17.—Physical and Chemical Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct				pH
JnF: Jefferson-----	0-7	10-25	1.30-1.50	2-6	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5	4.5-5.5
	7-56	18-34	1.30-1.65	2-6	0.10-0.16	0.0-2.9	---	.17	.24		4.5-5.5
	56-60	15-30	1.30-1.65	2-6	0.08-0.14	0.0-2.9	---	.17	.24		4.5-5.5
LbB: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
LbC: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
LbD: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
LgC: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5

Table 17.—Physical and Chemical Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct				pH
IgE: Gilpin-----	0-6	12-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3	3.6-5.5
	6-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	21-25	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	---	.24	.49		3.6-5.5
	25-27	---	---	0.00- 0.00	---	---	---	---	---		---
ImC: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
Ramsey-----	0-4	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0	.20	.20	1	4.5-6.0
	4-10	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	---	.17	.20		4.5-6.0
	10-16	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	---	.17	.20		4.5-6.0
	16-18	---	---	0.00-0.2	---	---	---	---	---		---
ImD: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
Ramsey-----	0-4	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0	.20	.20	1	4.5-6.0
	4-10	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	---	.17	.20		4.5-6.0
	10-16	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	---	.17	.20		4.5-6.0
	16-18	---	---	0.00- 0.00	---	---	---	---	---		---
ImE: Lily-----	0-3	7-27	1.20-1.40	0.6-6	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2	3.6-5.5
	3-30	7-27	1.25-1.35	2-6	0.12-0.18	0.0-2.9	---	.28	.28		3.6-5.5
	30-37	---	---	0.00- 0.00	---	---	---	---	---		---
Ramsey-----	0-4	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0	.20	.20	1	4.5-6.0
	4-10	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	---	.17	.20		4.5-6.0
	10-16	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	---	.17	.20		4.5-6.0
	16-18	---	---	0.00- 0.00	---	---	---	---	---		---
LoB: Lonewood-----	0-20	12-27	1.30-1.40	0.6-2	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3	4.5-5.5
	20-28	17-36	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	28-55	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	55-57	---	---	0.00- 0.00	---	---	---	---	---		---
LoC: Lonewood-----	0-20	12-27	1.30-1.40	0.6-2	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3	4.5-5.5
	20-28	17-36	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	28-55	18-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	---	.32	.32		4.5-5.5
	55-57	---	---	0.00- 0.00	---	---	---	---	---		---

Table 17.—Physical and Chemical Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	<u>In</u>	<u>Pct</u>	<u>g/cc</u>	<u>In/hr</u>	<u>In/in</u>	<u>Pct</u>	<u>Pct</u>				<u>pH</u>
Pp:											
Pope-----	0-8	7-27	1.20-1.40	0.6-2	0.14-0.23	0.0-2.9	1.0-4.0	.37	.37	5	3.6-5.5
	8-43	5-27	1.30-1.60	0.6-6	0.10-0.18	0.0-2.4	5-6.018	0.0-2.9	-1.18	0.0-2.9	36-48   0.0-2.9



Table 17.--Physical and Chemical Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Soil reaction
								Kw	Kf	T	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct				pH
ShC: Shelocta-----	0-10	7-27	1.15-1.30	0.6-2	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3	4.5-5.5
	10-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		4.5-5.5
	21-60	18-40	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	---	.17	.28		4.5-5.5
ShD: Shelocta-----	0-10	7-27	1.15-1.30	0.6-2	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3	4.5-5.5
	10-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		4.5-5.5
	21-60	18-40	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	---	.17	.28		4.5-5.5
ShE: Shelocta-----	0-10	7-27	1.15-1.30	0.6-2	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3	4.5-5.5
	10-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		4.5-5.5
	21-60	18-40	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	---	.17	.28		4.5-5.5
W. Water	0-10	7-27	1.15-1.30	0.6-2	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3	4.5-5.5
	10-21	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	---	.28	.28		4.5-5.5
	21-60	18-40	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	---	.17	.28		4.5-5.5
WrB: Wernock-----	0-12	12-27	1.20-1.40	0.6-2	0.19-0.23	0.0-2.9	0.5-4.0	.37	.37	3	3.6-7.3
	12-35	18-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	---	.32	.32		3.6-7.3
	35-37	---	---	0.00- 0.00	---	---	---	---	---		---
WrC: Wernock-----	0-12	12-27	1.20-1.40	0.6-2	0.19-0.23	0.0-2.9	0.5-4.0	.37	.37	3	3.6-7.3
	12-35	18-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	---	.32	.32		3.6-7.3
	35-37	---	---	0.00- 0.00	---	---	---	---	---		---

# Soil Survey of Morgan County, Tennessee

Table 18.—Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table.  
Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
Ac:						
Allegheny-----	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		April	5.0-6.0	>6.0	Very brief	Occasional
		May-Nov	---	---	---	None
		December	5.0-6.0	>6.0	Very brief	Occasional
Cotaco-----	C	January	1.5-2.5	>6.0	Very brief	Occasional
		February	1.5-2.5	>6.0	Very brief	Occasional
		March	1.5-2.5	>6.0	Very brief	Occasional
		April	1.5-2.5	>6.0	Very brief	Occasional
		May-Oct	---	---	---	None
		November	1.5-2.5	>6.0	Very brief	Occasional
		December	1.5-2.5	>6.0	Very brief	Occasional
At:						
Atkins-----	D	January	0.0-1.0	>6.0	Brief	Frequent
		February	0.0-1.0	>6.0	Brief	Frequent
		March	0.0-1.0	>6.0	Brief	Frequent
		April	0.0-1.0	>6.0	Brief	Frequent
		May-Nov	---	---	---	None
		December	0.0-1.0	>6.0	Brief	Frequent
Bm:						
Bethesda-----	C	Jan-Dec	---	---	---	None
Mines pits.						
GnC:						
Gilpin-----	C	Jan-Dec	---	---	---	None
GnD:						
Gilpin-----	C	Jan-Dec	---	---	---	None
GpE:						
Gilpin-----	C	Jan-Dec	---	---	---	None
Petros-----	D	Jan-Dec	---	---	---	None

# Soil Survey of Morgan County, Tennessee

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
GpF: Gilpin-----	C	Jan-Dec	---	---	---	None
Petros-----	D	Jan-Dec	---	---	---	None
GsF: Gilpin-----	C	Jan-Dec	---	---	---	None
Bouldin-----	B	Jan-Dec	---	---	---	None
Petros-----	D	Jan-Dec	---	---	---	None
HeB: Hendon-----	C	Jan-Dec	---	---	---	None
HeC: Hendon-----	C	Jan-Dec	---	---	---	None
JnF: Jefferson-----	B	Jan-Dec	---	---	---	None
LbB: Lily-----	B	Jan-Dec	---	---	---	None
LbC: Lily-----	B	Jan-Dec	---	---	---	None
LbD: Lily-----	B	Jan-Dec	---	---	---	None
LgC: Lily-----	B	Jan-Dec	---	---	---	None
Gilpin-----	C	Jan-Dec	---	---	---	None
LgD: Lily-----	B	Jan-Dec	---	---	---	None
Gilpin-----	C	Jan-Dec	---	---	---	None

# Soil Survey of Morgan County, Tennessee

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
LgE: Lily-----	B	Jan-Dec	---	---	---	None
Gilpin-----	C	Jan-Dec	---	---	---	None
LmC: Lily-----	B	Jan-Dec	---	---	---	None
Ramsey-----	D	Jan-Dec	---	---	---	None
LmD: Lily-----	B	Jan-Dec	---	---	---	None
Ramsey-----	D	Jan-Dec	---	---	---	None
LmE: Lily-----	B	Jan-Dec	---	---	---	None
Ramsey-----	D	Jan-Dec	---	---	---	None
LoB: Lonewood-----	B	Jan-Dec	---	---	---	None
LoC: Lonewood-----	B	Jan-Dec	---	---	---	None
Pp: Pope-----	B	January February March April May-Nov December	5.0-6.0 5.0-6.0 5.0-6.0 5.0-6.0 --- 5.0-6.0	>6.0 >6.0 >6.0 >6.0 --- >6.0	Brief Brief Brief Brief --- Brief	Frequent Frequent Frequent Frequent None Frequent
Philo-----	B	January February March April May-Nov December	1.5-3.0 1.5-3.0 1.5-3.0 1.5-3.0 --- 1.5-3.0	>6.0 >6.0 >6.0 >6.0 --- >6.0	Brief Brief Brief Brief --- Brief	Frequent Frequent Frequent Frequent None Frequent
RaC: Ramsey-----	D	Jan-Dec	---	---	---	None
Rock outcrop.						

# Soil Survey of Morgan County, Tennessee

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
RaD: Ramsey-----	D	Jan-Dec	---	---	---	None
Rock outcrop.						
RaF: Ramsey-----	D	Jan-Dec	---	---	---	None
Rock outcrop.						
SeC: Sequoia-----	C	Jan-Dec	---	---	---	None
SeD: Sequoia-----	C	Jan-Dec	---	---	---	None
ShC: Shelocta-----	B	Jan-Dec	---	---	---	None
ShD: Shelocta-----	B	Jan-Dec	---	---	---	None
ShE: Shelocta-----	B	Jan-Dec	---	---	---	None
W. Water						
WrB: Wernock-----	B	Jan-Dec	---	---	---	None
WrC: Wernock-----	B	Jan-Dec	---	---	---	None

# Soil Survey of Morgan County, Tennessee

Table 19.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top <u>In</u>	Hardness		Uncoated steel	Concrete
Ac:						
Allegheny-----	---	---	---	None	Low	High
Cotaco-----	---	---	---	None	Moderate	High
At:						
Atkins-----	---	---	---	None	High	Moderate
Bm:						
Bethesda-----	---	---	---	None	Moderate	High
Mines pit.						
GnC:						
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
GnD:						
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
GpE:						
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
Petros-----	Bedrock (paralithic)	10-20	Strongly cemented	None	Low	Moderate
GpF:						
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
Petros-----	Bedrock (paralithic)	10-20	Strongly cemented	None	Low	Moderate
GsF:						
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
Bouldin-----	---	---	---	None	Low	Moderate
Petros-----	Bedrock (paralithic)	10-20	Strongly cemented	None	Low	Moderate
HeB:						
Hendon-----	Fragipan	24-36	Very weakly cemented	None	Low	Moderate
HeC:						
Hendon-----	Fragipan	24-36	Very weakly cemented	None	Low	Moderate
JnF:						
Jefferson-----	---	---	---	None	Moderate	High

# Soil Survey of Morgan County, Tennessee

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top <u>In</u>	Hardness		Uncoated steel	Concrete
LbB: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
LbC: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
LbD: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
LgC: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
LgD: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
LgE: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Gilpin-----	Bedrock (paralithic)	20-40	Strongly cemented	None	Low	High
LmC: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Ramsey-----	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
LmD: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Ramsey-----	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
LmE: Lily-----	Bedrock (lithic)	20-40	Indurated	None	Moderate	High
Ramsey-----	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
LoB: Lonewood-----	Bedrock (paralithic)	40-72	Strongly cemented	None	Low	Moderate
LoC: Lonewood-----	Bedrock (paralithic)	40-72	Strongly cemented	None	Low	Moderate
Pp: Pope-----	---	---	---	None	Low	High
Philo-----	---	---	---	None	Low	High
RaC: Ramsey-----	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
Rock outcrop.						

# Soil Survey of Morgan County, Tennessee

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		<u>In</u>				
RaD: Ramsey----- Rock outcrop.	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
RaF: Ramsey----- Rock outcrop.	Bedrock (lithic)	7-20	Indurated	None	Low	Moderate
SeC: Sequoia-----	Bedrock (paralithic)	20-40	Strongly cemented	None	High	Moderate
SeD: Sequoia-----	Bedrock (paralithic)	20-40	Strongly cemented	None	High	Moderate
ShC: Shelocta-----	---	---	---	None	Low	High
ShD: Shelocta-----	---	---	---	None	Low	High
ShE: Shelocta-----	---	---	---	None	Low	High
W. Water						
WrB: Wernock-----	Bedrock (paralithic)	30-40	Strongly cemented	None	Moderate	High
WrC: Wernock-----	Bedrock (paralithic)	30-40	Strongly cemented	None	Moderate	High



# Soil Survey of Morgan County, Tennessee

Table 20.—Classification of the Soils

Soil name	Family or higher taxonomic class
Allegheny-----	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Atkins-----	Fine-loamy, mixed, active, acid, mesic Typic Fluvaquents
Bethedsa-----	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Bouldin-----	Loamy-skeletal, siliceous, subactive, mesic Typic Paleudults
Cotaco-----	Fine-loamy, mixed, active, mesic Aquic Hapludults
Gilpin-----	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Hendon-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Jefferson-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lily-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lonewood-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Petros-----	Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts
Philo-----	Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
Pope-----	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Ramsey-----	Loamy, siliceous, subactive, mesic Lithic Dystrudepts
Sequoia-----	Fine, mixed, semiactive, mesic Typic Hapludults
Shelocta-----	Fine-loamy, mixed, active, mesic Typic Hapludults
Wernock-----	Fine-silty, mixed, semiactive, mesic Typic Hapludults

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